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A Comprehensive Analysis of Food Insecurity and Solutions in Worcester, Massachusetts

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Executive Summary

Worcester, Massachusetts is a postindustrial city with high levels of potential that faces the persistent obstacle of food insecurity for its low-income and ethnic minority communities. This research thesis examines food insecurity in general and explores data and trends in Worcester, then combines this with conceptual frameworks which explain how socioeconomic factors play into food security. It also explains the systemic inequalities present as a result of food insecurity and critiques academic assumptions surrounding food insecurity. One of these assumptions is that food deserts on their own can explain food insecurity in Worcester and elsewhere, though it has been found that food swamps and food mirages are more accurate representations of the reality of food insecurity. With this theoretical foundation set, the paper builds towards general solutions to food insecurity and specific solutions that work for Worcester. It is found that food insecurity is ultimately a complex issue rooted in systemic inequalities, especially when it comes to the disproportionate rate of food insecurity among ethnic minority communities in Worcester and around the U.S. Recommendations are made, mostly depending on the key strength that is Worcester's highly collaborative network of community organizations, businesses, nonprofits, and government which combats food insecurity in a coordinated manner, with different organizations fulfilling different roles of relief and social justice empowerment. With Worcester at a turning point as it begins to see more and more economic development investments, it is important that the city's organizations continue to collaborate on eliminating food insecurity and develop a cohesive, equitable economic development strategy so all residents can enjoy the opportunity that Worcester promises.

Introduction

Worcester, Massachusetts is in many ways a historical microcosm of America. From revolutionary roots to industrial innovation, Worcester has always presented itself as a city that values liberty, equality, and opportunity. For many years, the city truly was the "heart of the Commonwealth" and a prominent center of industry and transportation in New England. Much like the country at large, droves of immigrants over the past century and a half made Worcester their home in search of new opportunities and a better life for their families. However, de-industrialization in the second half of the twentieth century hit Worcester hard, causing job losses that drove rapid demographic and societal changes, as it did across the country (Worcester Historical Museum, 2013). Only in the past twenty years did Worcester really begin to make its comeback and put itself back on the map through strategic economic development investments, sound governance, and active, cooperative community organizations. The city's path to recovery and finding an identity is a model for hundreds of others of American cities and towns still trying to find their way in the twenty-first century.

Of course, like the rest of America, there are persistent obstacles to social justice, equality, and equity of outcomes for all people. One of the ways in which these obstacles manifest themselves is through food insecurity. While these issues are persistent, that does not mean community organizations and governments should surrender all efforts to their inevitability. Instead, members of the community must recognize food insecurity as a prominent cause of inequality, suffering, and injustice, and must strive to eradicate its effects for every affected individual so that the horizon of opportunity is broadened for everyone. Individuals struggling with food insecurity are friends, families, and loved ones, and one may be surprised to learn that people they know and love are food insecure. It is a sweeping issue associated with a

complex set of conditions. Those who are food insecure deserve nothing less than a concerted, prioritized effort to have their struggles alleviated. Only then can Worcester, and America at large, make progress in living up to their promises as a land of opportunity.

This research thesis will examine the conditions that create food insecurity around America and identify the specific and relevant factors present in Worcester's own issues with food insecurity. This examination includes a review of the latest conceptual frameworks and data explaining the behavioral psychology of food insecure individuals and the environmental factors which exacerbate the cycle of food insecurity in low-income populations. Then, it will analyze Worcester's own food insecurity conditions which disproportionately affect residents and college students of color and seek to inform today's issues using the city's history and recent demographic and economic changes. After examining Worcester's food insecurity problems, a rigorous examination will be conducted of the term "food desert" and other commonly accepted concepts and assumptions such as the use of U.S. Census tracts in statistical analysis to ascertain if they are appropriate and helpful understandings of the complex and multifaceted issues of food insecurity. General solutions to food insecurity will be proposed off this theoretical foundation, followed by building towards specific solutions to address food insecurity based on what community organizations and governments are currently doing in Worcester. Finally, policy and advocacy recommendations will be made for Worcester's specific conditions of food insecurity.

Ultimately, this paper finds that food insecurity is a broad and cross-sectional issue with roots in poverty, racial inequality, and other systemic public policy problems. Worcester in the immediate future must contend with the ramifications of food insecurity, causing many of the city's low income and diverse communities to become trapped in a vicious cycle of poverty, poor health, fewer employment options, and generally decreased opportunity. The city and private

developers' massive investments in Polar Park, the new home of the Worcester Red Sox, and the surrounding Canal District and downtown are bringing new attention and development to the city like never before. Truly, Worcester is at a turning point. To bring about equitable outcomes for all residents in Worcester and prevent them from being left behind in Worcester's economic revival, grassroots community food security organizations must be supported and publicized to residents in-need, government at all levels must work closely to promote such organizations, and other community groups must continue to coordinate their efforts to bolster the regional food system and bring about equity in distribution of food.

Food Insecurity Explained

In 2019, it was estimated that about one in ten Americans were food insecure. This figure represents an estimated 35.2 million people living in food-insecure households, including 5.3 million children (Coleman-Jensen et. al, 2020). As a result of the COVID-19's impact on the economy and public health, it is estimated that the number was as high as 50 million in 2020 and could still be as high as 42 million in 2021 (Feeding America, 2021). If food insecurity is such a prevalent issue in the United States, what exactly is it?

The U.S. Department of Agriculture, or USDA, defines food insecurity as "a lack of consistent access to enough food for an active healthy life," (USDA, 2021). It is important to note there is a distinction between hunger and food insecurity, with food insecurity being considered a "household-level economic and social condition of limited or uncertain access to adequate food," while hunger is considered an "individual-level physiological condition that may

result from food insecurity," (USDA, 2021). In other words, food insecurity is the condition that leads to chronic hunger.

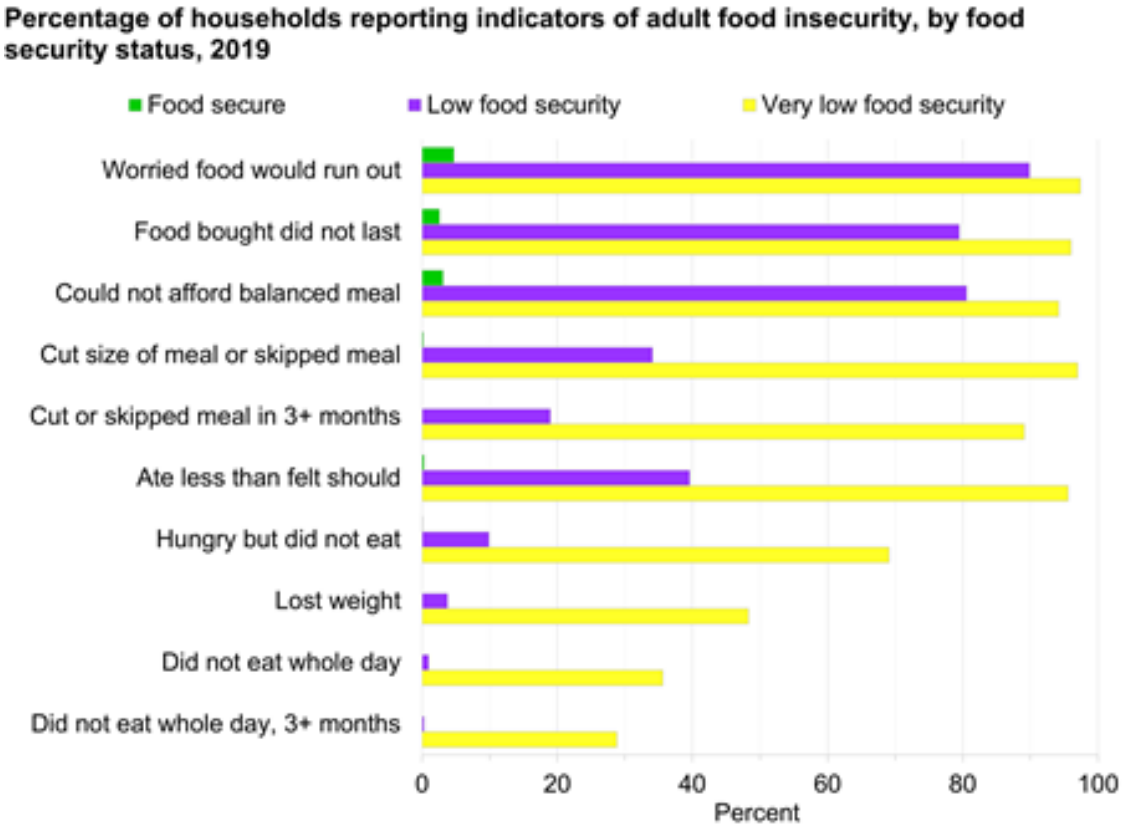
Food insecurity is not an issue that can be viewed in a vacuum – it is a complex condition. There is correlation between low-income households and households that are food insecure – with fewer resources to meet basic needs, families' risk of not having reliable sources of food increases. However, not every household living at or below the poverty line struggles with food insecurity. The same goes for the other end of the spectrum; households that live above the poverty line can also experience food insecurity. People's access to food depends on multiple, overlapping issues which include social isolation, chronic or acute health problems, access to affordable housing, high medical costs, and low-earning jobs. Therefore, effective measures to respond to food insecurity must be understanding of its cross-sectional nature (Feeding America, 2021b).

Levels of Food Insecurity

The level to which a household is food insecure or food secure is also an important concept to note. Four commonly accepted levels of food security include high food security, marginal food security, low food security, and very low food security. This hierarchy is displayed in Figure 1 (Feeding America, 2021b). The USDA's Economic Research Service surveyed households at each of these different levels to identify which conditions are experienced at each level of food security. This can be seen in Figure 2. The data from this chart shows that households experiencing low or very low food security levels can face extreme difficulty in eating regularly and in a healthy manner (USDA, 2021). This hierarchy of classification allows researchers, policymakers, and community organizers to be specific as to what areas within the broad scope of food insecurity they are trying to address.

Source: Adapted from the USDA Economic Research Service.

Figure 1: The commonly accepted hierarchy of food security classification levels. Source: Feeding America, 2021



Source: USDA, Economic Research Service, using data from the December 2019 Current Population Survey Food Security Supplement.

Figure 2: Reported indicators of food insecurity. Source: USDA Economic Research Service, 2019

There is evidence that income level, health level, and level of food security can all be related. While not exactly causal, there is correlation between the three variables and it is crucial to understand how they are connected.

Studies have shown that income level is a significant determining factor for households' level of food security. For instance, Dr. Barbara Laraia and a team of dietitians and public health specialists from the University of California published findings in the American Journal of Preventive Medicine in 2017 that discovered that individuals in low-income households are more at risk for developing behavioral factors that shape poor nutrition. They found that the cost in time and money for acquiring and preparing nutritious food are the primary economic considerations for food insecure families. Other non-economic factors for diet decision-making for low-income individuals include the variety of food options accessible to them, their eating behaviors, and any diet-related chronic conditions they may have. Importantly, the researchers found that, "low-income individuals have a higher burden of employment-, food-, and housing-related insecurity that threatens the livelihood of their household," (Laraia et al., 2017). Poor diet quality can be exacerbated by high levels of stress caused by these life problems, which drives poor diet behaviors as coping mechanisms (Laraia et al., 2017).

Poor diet quality can lead to diet-related chronic diseases such as diabetes, hypertension – which is also known as high blood pressure – and generally poor health. A 2014 study conducted by Feeding America, a nationwide food bank organization, found that fifty-eight percent of food insecure households reported having a member with high blood pressure and thirty-three percent had at least one member with diabetes. The prominence of diet-related diseases in households that are food insecure can be explained with a concept known as the "cycle of food insecurity and chronic disease," (Feeding America, 2021c).

This concept, developed by Dr. Hilary Seligman and Dr. Dean Schillinger from the University of California San Francisco, explains the vicious economic cycle that food insecure households with few resources become trapped in. The researchers found that individuals in food insecure households develop unhealthy coping strategies to deal with constrained dietary options, resulting in behaviors such as overeating when they have access to food, skipping meals in an effort to save food, and purchasing more readily available processed food options that are high in sodium, sugar, and unhealthy complex carbohydrates. These poor diets and poor habits lead directly to chronic diseases, which lead to increased healthcare expenditures. These households end up expending a significant portion of their earnings on such costs, resulting in less of a budget for healthy food. All the while, the catalyst for the cycle to continue is increased stress on the individual, as was noted in the research conducted by Dr. Laraia's team. The cycle continues until affordable and healthy food options can be consistently acquired (Seligman and Schillinger, 2010).

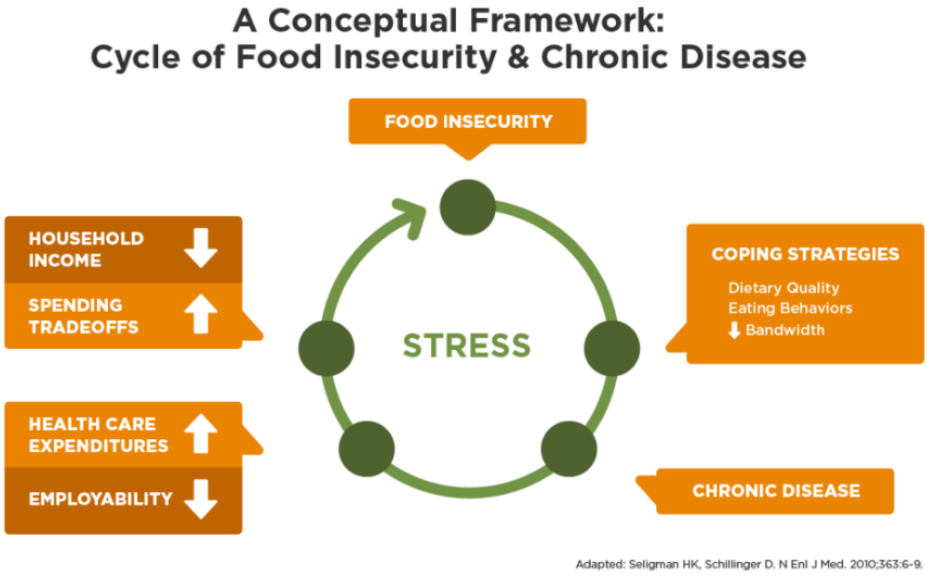


Figure 3: The cycle of food insecurity and chronic disease as adapted by Feeding America. Source: Seligman and Schillinger, 2010, as in Feeding America, 2021c

Food Deserts

Understanding food access in Worcester requires an understanding of a popular term used by researchers, academics, and activists – "food deserts". A food desert is a concept which seeks to explain the conditions that cause food insecurity by examining geographic proximity of households in certain neighborhoods to healthy and affordable food options. The concept is similar to household-level food insecurity but applies to a broader scale meant to indicate systemic challenges to achieving equity in healthy and nutritious food distribution. Food deserts are associated a multitude of socioeconomic conditions in certain neighborhoods – income level, education level, and ethnic minority. The USDA specifically defines food deserts as majority low-income U.S. Census tracts – zones drawn by the Census with roughly equal populations of 4,000 – in which "a substantial number or proportion of the population has low access to supermarkets or large grocery stores," (Dutko et. al, 2012, p. 5). Using this definition, experts estimate around 23.5 million Americans live in food deserts (Caporuscio, 2020).

While both rural and urban areas can be considered food deserts, the focus for solving Worcester's food accessibility issues requires a close look at urban food desert conditions. In urban areas, at least five hundred people or thirty-three percent of the population in the Census tract must live more than one mile – or one half-mile, depending on the tract's geographic size – from the nearest supermarket. A 2012 USDA report found that tracts with low income levels, high levels of unemployment, inadequate access to transportation, and fewer food retailers with fresh and affordable produce are more likely to become host to food deserts. Research also finds that urban neighborhoods consisting of primarily low-income minority ethnic groups have less access to healthy food than wealthier and predominantly white neighborhoods (Dutko et. al, 2012, p. 3).

Though, food deserts are not the only indicator of food insecurity in an area. Food swamps are regions with adequate geographic proximity to healthy and affordable food, but also have an overabundance of less nutritious and healthy food options in that same area. Food mirages are areas where people live close to grocery stores that offer the healthy and nutritious food needed for a healthy diet, but the food is unaffordable to many lower-income residents (Caporuscio, 2020). These concepts will be explored in depth in a later section. First, it is important to identify how food insecurity specifically affects Worcester.

Food Deserts and Food Insecurity in Worcester

A 2013 study by Worcester Polytechnic Institute (WPI) serves as one of the benchmark studies of food deserts in Worcester. The study, which three engineering students conducted on behalf of the Worcester Food Policy Council for their thesis project, identifies food insecurity problems in Worcester and evaluates the sustainability of the local food system. The study, called the Worcester Community Food Assessment, found that Worcester adults have a higher prevalence of diet-related diseases and obesity than the state's statistical average. Using the USDA's Food Access Research Atlas, the authors identified five geographic areas where Census tracts that meet the USDA's definition of a food desert are concentrated. These general areas included swaths of the city's southwest, south, southeast, and northeast neighborhoods (Chen, Kaczmarek, and Ventola, 2013, pp. 1-10).

Upon cross-referencing the Community Food Assessment authors' findings with the latest available data from the USDA's Atlas, it was found that Worcester still faces the prominence of urban food deserts. There are twenty-nine Census tracts in Worcester that are

considered low income, and twenty of these low-income tracts meet the criteria for food deserts, with a significant portion of residents being a half-mile or more from the nearest supermarket. Eight of these food desert tracts also have more than one hundred low-income households that do not have access to a vehicle (USDA ERS, 2021).

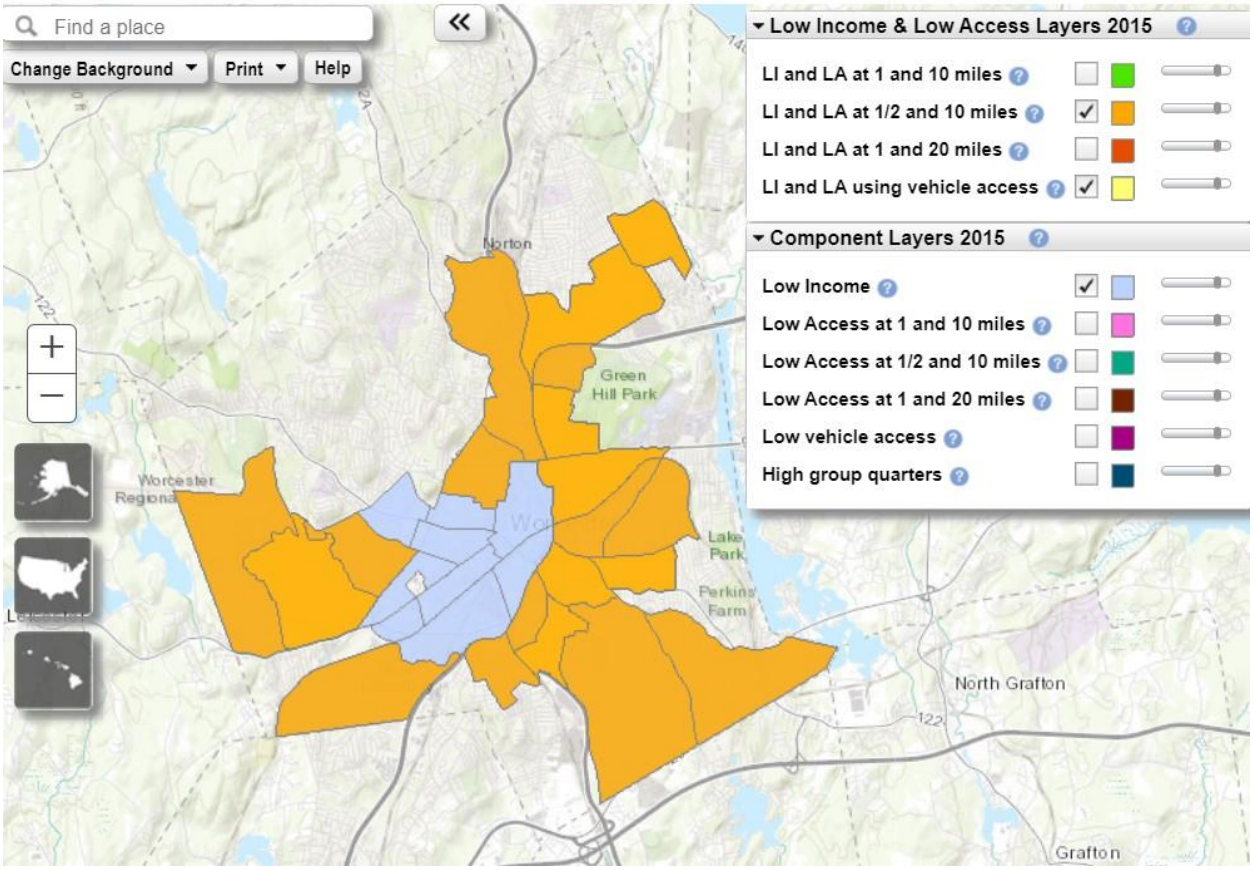


Figure 4: Layering data using USDA Economic Research Service's Food Access Research Atlas. Worcester's 29 low-income Census tracts (blue and orange) and 20 food desert tracts (orange). 8 of these food desert tracts have relatively low access to personal vehicles. Source: USDA ERS, 2021

While the USDA's definition of a food desert – a Census tract with a large low-income population which is distant from local supermarkets – is not a be-all, end-all way to identify areas with food insecurity, it is helpful to know which areas of the city are generally affected.

The average household income of the twenty low-income food desert Census tracts in Worcester is $44,000 a year, and the average demographic makeup is 54.5% white. This data shows that Worcester's urban food deserts disproportionately affect low-income communities and communities of color (Justice Map, 2020).

The Food Insecurity Epidemic Among Students

Food insecurity affects a wide variety of individuals. One group which does not get the attention it deserves on food insecurity but has special relevance to Worcester as a college town is students.

Many college students struggle with food insecurity – one nationwide study showed that thirty-six percent of college students were food insecure in 2020. In community colleges, who tend to serve lower income students, this number inflates to up to a staggering fifty-six percent. With the immense and rapidly increasing cost of college, many students and their families find themselves in difficult situations with acquiring food. The pandemic has exacerbated this, as it has for many other people around the country. Forty percent of college students lost an internship, job, or job offer in the spring of 2020, leading to fewer resources for them to become financially independent and start to support themselves. The number of food insecure students by ethnicity was around forty-eight percent for Black students, forty-seven percent for Hispanic students, and fifty-one percent of Asian students, contrasted with about thirty percent of white students (MacDougall, 2019). As is the case in Worcester in general, food insecurity among students affects ethnic minorities at a disproportionate rate.

For many students who do not come from wealthy backgrounds, they have to juggle several classes, part-time jobs to support themselves, unpaid internships, and social lives.

Students often do not qualify for food stamps, as it requires twenty hours of work per week and students' busy academic schedules often prevent them from working that many hours. One student from Clark University featured in Worcester Magazine described their difficulty as a food insecure student who manages several responsibilities, including their academic commitments, extracurricular activities such as student council, their duties as a resident advisor, and two on-campus jobs. Still, the student could not afford to upgrade their meal plan past five meals per week. The problem is not isolated to Clark, however. Worcester State University conducted a study which found one in three students were food insecure, something the administration called a "crisis" (MacDougall, 2019).

Furthermore, food insecure students struggle with finding support systems for their difficulty in finding affordable and healthy food. Students often do not opt to visit food pantries or shelters, as it can be embarrassing to be seen by their peers, classmates, or professors in public and/or because they believe their food insecurity is not as severe as it is for adult residents of the community around their campus. The pandemic has changed the way many universities, including Clark, has seen food insecurity in its students (MacDougall, 2019). Introducing student-accessible pantries and subsidizing meals for students have worked as temporary relief, but the root issue that must be addressed is the rising cost of a college education. It is important to recognize that Worcester is a city which relies on its eight colleges and universities with more than 35,000 students to drive its economy, retain talent, bring new people to the city, and employ large numbers of residents, so combating food insecurity in this population is important to the city's identity.

Food Security and Social Justice in Worcester and America

When discussing low income rates and low food security levels among ethnic minority populations, it is especially important to note the role of social justice in achieving food security.

Worcester is a proudly diverse city with high proportions of immigrant, refugee, first-generation, and ethnic minority communities. There are an estimated 37,970 immigrants from eighty-five countries that call Worcester home, a number that comprises twenty-one percent of the city's total population. Statewide, the number of immigrants as a share of the population is only fifteen percent. The most frequent countries of origin for Worcester immigrants include Ghana, the Dominican Republic, Vietnam, Brazil, and Albania. An estimated seventy percent of all East Asians and forty-six percent of all Blacks in Worcester are foreign-born. Twenty-four percent of all Hispanics and twelve percent of all white residents are foreign-born. Worcester also had 2,196 refugee arrivals between 2007 and 2012, suggesting the city is a common relocation destination for refugees. These immigrant and refugee populations typically find themselves in lower income brackets than their white and domestic-born neighbors, and are clustered in many of the city's low-income and diverse Census tracts, most of which are considered food deserts (Goodman et. al, 2015, pp. i-7).

The city's diverse populations are most often affected by food insecurity, much like rates elsewhere in the U.S., but this still raises social justice issues. Studies show that food insecurity adversely impacts the health and social integration of refugees and recent immigrants as they try to adjust to an entirely new way of life, inhibiting their ability to start their American life with the same resources as a domestically born person (Lawlis, Islam, and Upton, 2018). Food insecurity puts immigrants and refugees at a decided disadvantage from the start of their life here in America and in Worcester.

Further food justice studies show that food insecurity is a problem in distribution, not scarcity. Unsustainable farming practices such as destroying excess crops to keep market prices high, unfettered wastefulness on the part of food distributers and consumers, and a lack of local consumption for locally produced food all contribute to inequitable distribution of food so that it does not reach low-income communities (Biesalski and Konrad, 2020). While only ten percent of white households nationally experience chronic hunger, that number is estimated to be up to twenty-one percent for households with people of color, speaking to a problem of disproportionate distribution (Alliance to End Hunger, 2017).

There are several systemic ways in which food insecurity disproportionately affects households of color. As evidenced in research by Dr. Laraia's team, Dr. Seligman, and Dr. Schillinger, socioeconomic factors play a massive role in influencing ethnic minority households' ability to access healthy and affordable food. Public schools with majority Black, Latinx, and/or Hispanic students, such as Worcester Public Schools, are less able to provide fresh produce and low-fat milk options than majority-white schools. Black Americans face unemployment rates that are double that of white Americans, regardless of education level. People of color are also far less likely to be able to become homeowners than their white counterparts, resulting in fewer assets and housing security. As discussed in a previous section, health outcomes are also extremely inequitable – high rates of diet-related diseases among ethnic minority populations lead to high healthcare costs and painful chronic health problems. Compounding this factor, studies show that forty-four percent of Latinx and thirty-four percent of Black Americans do not see a doctor when sick because of financial reasons (Alliance to End Hunger, 2017).

Demonstrating the social problem of food distribution, only eight percent of Black Americans have a grocery store in their Census tract, and twenty-four percent of Black Americans do not own cars to make trips to the grocery store. So even when there is a grocery store within their neighborhood, Black Americans still have difficulty attaining healthy and affordable food. Studies have shown that food retailers located in communities with majority-minority populations are often further away and tend to have fewer nutritious and healthy food options (Alliance to End Hunger, 2017). These systemic problems of access demand an answer beyond the conceptual framework of food deserts.

Food insecurity may just be one piece of a wide-ranging and cross-sectional disparity between ethnic minority communities' life outcomes and the life outcomes of wealthier, white Americans, but it plays a large role in perpetuating inequality. In Worcester, bringing social justice to every resident requires bringing solutions to inequality in food distribution.

Worcester's History as it Relates to Food Insecurity

To better understand how the roots of widespread and systemic food insecurity took hold in Worcester, one must look at the history of the city and its demographic and economic trends over time.

Worcester's history is closely intertwined with the course of American history and national trends in poverty and food security over the past couple of centuries. It is a verifiable melting pot of different immigrant communities, many of which came to this country with very little and became caught in the cycle of food insecurity. Domestic-born, low-income populations also have migrated to Worcester in recent years in large numbers, picking up on the trend of

immigration as they look for more affordable living situations outside the Greater Boston Area's high cost of living (Ramachandran and Howard, 2019, p. 38). Worcester has a history of being an attractive option for migrant households looking to find a more affordable living situation or a more promising job market. These low-income households tend to be affected more by food insecurity. Understanding this history is the first step in addressing the problem.

Worcester started to grow quickly in the mid-1800s off the back of transportation and manufacturing innovations that drove large amounts of working-class people to town. The Blackstone Canal linked Worcester and Providence for the first time in 1828 (the Canal is now filled in, but used to terminate where downtown's Canal District is today), and the first rail link between Boston and Worcester was opened in 1835. These early transportation arteries put Worcester at a crossroads for an increasingly industrious New England and opened up the possibility of large-scale manufacturing (Worcester Historical Museum, 2013).

Large factories and mills began to crop up all over Worcester, concentrated where South Worcester and the Canal District are today. The city's strengths were woodworking and metalworking, and the city was also home to a substantial sector of mechanics producing machine tools that were shipped out across the country. In the decades right after the Civil War, Worcester came into its own as an industrial hub, with the population booming from 50,000 to 118,000 in just forty years (Worcester Historical Museum, 2013). At its peak in 1880, Worcester was the 28th most populous in the entire country (Biggest US Cities, 2021). Immigrants from across the world poured into the city, creating what has been described as an "ethnic mosaic" of Lithuanians, Poles, Italians, Greeks, Finns, Syrians, and Armenians – many of which still populate the city in significant numbers today (Worcester Historical Museum, 2013). To accommodate the massive influx of foreign-born workers, the so-called "three decker" three-

story houses were constructed all across the city to fit multiple families in tenement-style housing (Worcester Historical Museum, 2013). Many of these three deckers still stand today, home to a new generation of working-class families and immigrants.

In the 1960s, American cities and towns began to feel the pangs of postwar deindustrialization as companies closed down or moved away in the face of global competition. Worcester was no exception, and suffered greatly from the loss of its manufacturing industries. Local investors at this point tried to pump money into keeping manufacturing jobs in the city, but even one of the largest and oldest Worcester firms, Norton Company, was bought out by the French company Saint-Gobain in the 1990s. The 1990s saw Worcester at its lowest point. Abandoned factories and mills and empty lots dotted the cityscape, with poverty and crime at relatively high levels (Jarvis, 2015) (Macrotrends, 2021). The population dropped precipitously from over 200,000 in 1950 to just 161,000 in 1980 (Biggest US Cities, 2021). However, many in the working-class and immigrant populations remained in Worcester, left behind by the industries that attracted them or their descendants there in the first place. This persistent poverty and lack of jobs for many working-class immigrant families is where the roots of food insecurity begin for today's post-industrial Worcester.

Given this historical context, the systemic issues of race and injustice that are tied to food insecurity, and the examination of current food insecurity conditions in Worcester, it is important to critique scholarly assumptions about so-called "food deserts" – how they are defined and applied – so as to understand if they are adequate understandings of Worcester's, or the country's, present food security conditions.

Critiques of "Food Deserts" and Other Academic Assumptions

To properly address the issue of food insecurity, which has already been established as a prevalent social justice issue and human rights issue, one must scrutinize academic assumptions to find the correct lens with which to analyze the problem.

One assumption is propagated by the USDA without ample explanation given to important contexts such as socioeconomic obstacles and racial equity and equality. The USDA's Economic Research Service is responsible for collecting statistics on food insecurity. The bureau's mission is to, "anticipate trends and emerging issues in agriculture, food, the environment, and rural America and to conduct high-quality, objective economic research to inform and enhance public and private decision making," (USDA ERS, 2021c). This is all to say that the bureau is focused on providing the economic data, but not necessarily presenting comprehensive solutions to justice in food distribution or overcoming social barriers to achieving food security for all. This mission is perfectly fine and is actually very important for publicizing food security data, but the data that ERS presents through its Food Access Research Atlas, the one utilized by the Worcester Community Food Assessment, must be understood as a tool to simply find which Census tracts are low-income and happen to not have a grocery store located nearby. It is important to understand that the USDA's data, which is the clearinghouse for public and academic information on food security, is not necessarily comprehensive.

Clark University researcher Brenna Robeson identified a similar issue about the use of GIS mapping and data collection. "GIS technology as a modern map-making tool can produce easily legible visuals and identify patterns in large and small corners of space," says Robeson (2019, p. 5). "When it is used to tell stories about space, specifically in the interests of diagnosing social problems, the results can often divert attention from the most seriously needed

courses of action, prioritizing visual and political convenience of narratives over authenticity or a mapping process embedded among other methods," she explains (Robeson, 2019, p. 5). The USDA's presentation of this GIS map in its ERS Food Access Research Atlas is certainly important, but policymakers, researchers, activists, and others should recognize that it does not tell the whole story and it is not meant to.

Many activists and academics have recognized this gap between how the federal government presents food insecurity data and the reality of the cross-sectional social justice issues surrounding food insecurity. Jonathan Sperling, a senior researcher and policy analyst from the U.S. Department of Housing and Urban Development, went so far as to call the Census Bureau's use of tracts, ZIP Codes, and other small-area statistics "tyranny" when used as proxies for an actual community or neighborhood (2012, p. 219). His argument is that geographical range can easily be manipulated to change what the statistics indicate, thereby obscuring the major issues happening in reality.

Census tracts are often employed in social science research and in state and federal grants funding, giving small-area statistics a disproportionately large say in how and if social justice issues are discussed and what solutions are implemented. If the data is not grounded in reality, it can distort government and community organizations' approach to the issues, rendering solutions ineffective. Sperling claims that units of analysis such as Census tracts must be continually realigned and discussed, even if, "no unit of statistical or administrative geography will ever be able to capture all of these [social and demographic] nuances," (2012, p. 222). For researchers, policymakers, public officials, and others, the onus is on their communities of practice to not get lost in the numbers and understand the socioeconomic context and the reality in cross-sectional issues such as food insecurity.

In that respect, the USDA's commonly accepted definition for a food desert is not all-encompassing. As explored earlier, food security is far too complex an issue – combining housing, race, transportation, income, health, and other variables – to boil down to the closest grocery store for a low-income Census tract. Since the USDA is the leading authority on food insecurity in America with its privileged access to federal data collections, it has helped popularize the academic concept of a "food desert". It is well-intentioned, and food deserts surely exist with real consequences for communities around the world, but the simplification of the problem creates a simplification of solutions. In this realm, if all a city had to do was build a supermarket in a low-income community, food deserts could be ended. However, shorter distance does not equate to easier access to healthier and more nutritious and affordable food. Solutions must prove diverse and comprehensive, with an understanding of the power dynamics of food distribution and social justice, and must be done in close partnership with community organizations and local governments to create a localized approach for each afflicted region.

Food Swamps and Food Mirages

Since the definition of a food desert is rather inflexible, researchers coined two other phrases – "food swamps" and "food mirages" – to more accurately describe conditions that create food insecurity but do not necessarily fall under the USDA definition of a food desert (NCCEH, 2017). The commonly accepted USDA definition delineates food deserts as Census tracts with at least several hundred low-income households and without a grocery store within a half-mile or a mile, depending on the size of the tract (Dutko et. al, 2012, p. 5).

Much of the research surrounding food swamps and mirages comes out of Canada, where urban food deserts are less common than in the U.S. Instead, Canadian public health experts have noted conditions dubbed "food swamps" are much more common (Warren, 2015). These

geographical areas may have healthy food retail options for consumers, but there is also an oversaturation of less healthy food and beverages in the local retail market. Less healthy food that is not as nutritious, such as packaged and processed food like chips, soda, burgers, and pizza, as opposed to fresh produce, is widely available at cheap prices in these food swamps, bogging down residents in a cycle of unhealthy food purchasing and consumption habits (NCCEH, 2017).

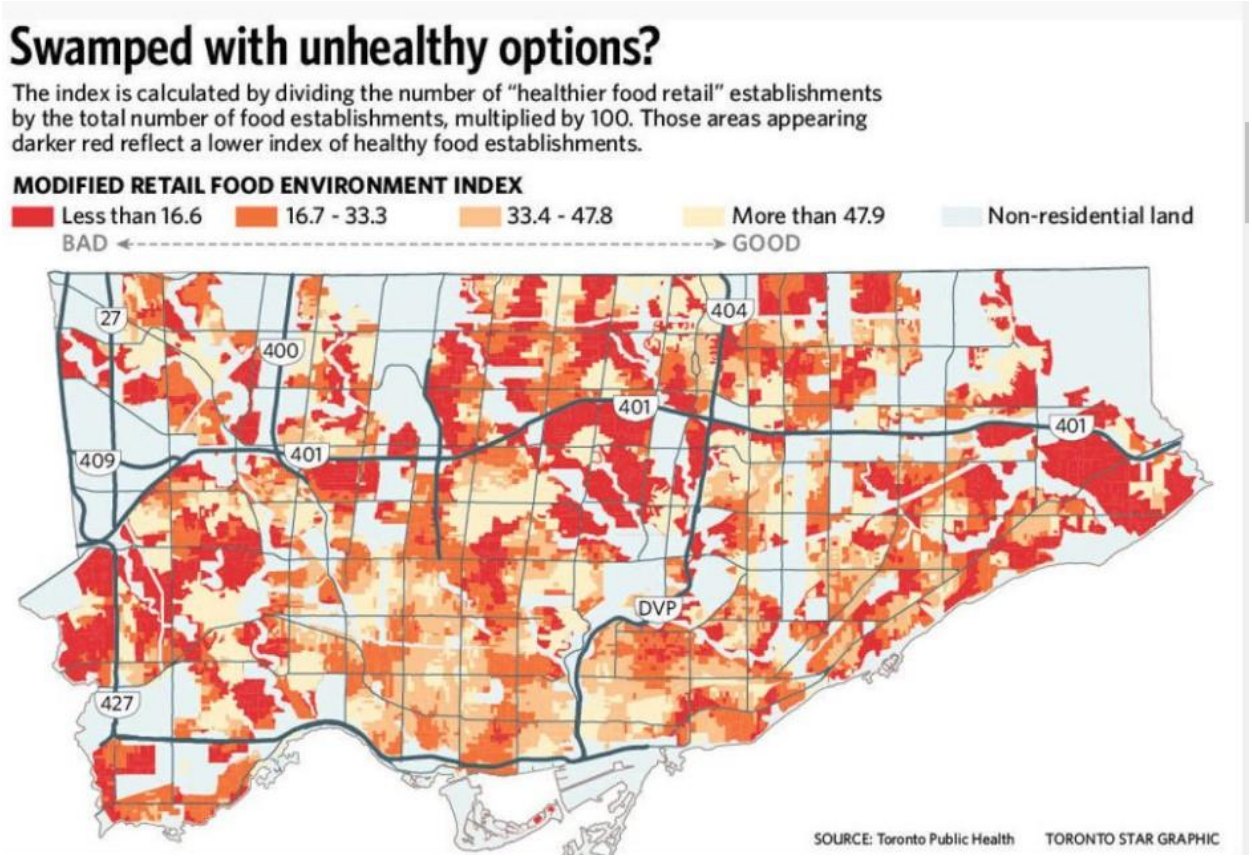


Figure 5: Toronto Star *mapped a "modified retail food environment index" to measure how "swamped" Toronto was with unhealthy food retailers. Source: Toronto Public Health as in* Toronto Star, 2015.

Food swamps are regarded as a larger problem in Canada than food deserts are when it comes to accessibility of healthy food. Studies from Toronto's public health department in 2015

show that the city is laden with food retailers such as corner stores and convenience stores that are stocked with not much more than candy bars, frozen pizzas, chicken nuggets, chips, and fries. Many supermarkets on the other hand, and specialty retailers such as butcher shops or fish stores, were in the same vicinity as these stores with less healthy food. However, the less healthy options far outnumbered the healthier ones in most areas, as indicated by the deep red districts on the map in Figure 5. City officials found that food swamps are in both high and low-income neighborhoods, though low-income food swamps raise more concerns for food justice since the people living there have fewer resources to dig themselves out of a cycle of going to these convenience stores for food (Warren, 2015).

One of the reasons food swamps are such a big concern for food security is because of the well-documented addictive effects of "junk food" on the human brain. A growing body of medical studies now show a link between the neurobiological reward system and processed foods, such as those commonly found in fast food retailers and convenience stores (Oginsky, et. al, 2016) (Blumenthal and Gold, 2010) (Carter et. al, 2016). Fast food companies have increasingly taken to pumping their foods full of sugar, sodium, and high fructose corn syrup, or HFCS. These ingredients release dopamine in the brain, causing the body to crave more of the same food (Kravitz, 2019). This chemical hijacking of the reward system is exactly how drug addictions form, and in fact, a 2013 study found HFCS and sodium to be as addictive as cocaine or heroin in certain people and in certain amounts (Volkow, 2014) (Smith, 2016). It is crucial to understand the addictive properties of processed foods which are sold at low prices in low-income neighborhoods. These addictive properties are significant factors – but not explicitly mentioned, unfortunately – in the cycle of food insecurity and chronic disease which was explored earlier. However important, a discussion about the addictiveness of processed, fast

foods merits its own separate discussion about social justice, equitable distribution, and systemic issues of race.

Consumption of unhealthy food is an epidemic of addiction, comparable to the tragic effects of the opioid epidemic. Yet the study of "food deserts" in a vacuum has no room for an understanding of this context surrounding addictiveness and oversaturation of processed and unhealthy foods in low-income communities. Similarly, food mirages must be understood as conditions that are more relevant to food security studies and solutions.

Food mirages are geographical areas that appear to have a multitude of healthy food options, but many residents lack the purchasing power to buy them and instead opt for less healthy and cheaper options. A study of food mirages in Winnipeg, Canada claims that, "while food deserts describe low-income areas with an absence of healthy food, the concept fails to account for individuals who live near healthy foods but may be unable to purchase them because of social deprivation or prohibitively high prices," (Wiebe and Distasio, 2016, p. 1). The study mapped areas considered food mirages and found that the inner city was particularly afflicted by these conditions, as shown in Figure 6.

Importantly, the researchers quantified "social deprivation" as a reason for inaccessibility, something that food deserts on their own do not account for. Classification of food mirages considers, "socio-economic characteristics that may present barriers," to an individual's ability to attain healthy food from supermarkets, including unemployment rate, education level, whether they are a recent immigrant, whether they are in a single parent household, and whether they can drive (Wiebe and Distasio, 2016, pp. 1-4).

Gentrification is a phenomenon that has been found to be a primary cause of food mirages, with the inflow of wealthier, white residents into previously low-income, diverse neighborhoods leading to the inflow of supermarkets promoting healthy living and environmental sustainability. White, college-educated residents are far more likely than all other demographic categories to shop at these types of grocery stores, such as Whole Foods Market, which tend to price out lower-income residents looking for more affordable food options. These supermarket companies need to be more aware of the communities they enter and how their presence can create a false sense of increased accessibility to affordable, healthy food (Sullivan, 2014).

Consideration of these socioeconomic factors in food mirages and food swamps is important in understanding the context behind urban food insecurity and how to address the systemic problems rooted in race and social justice.

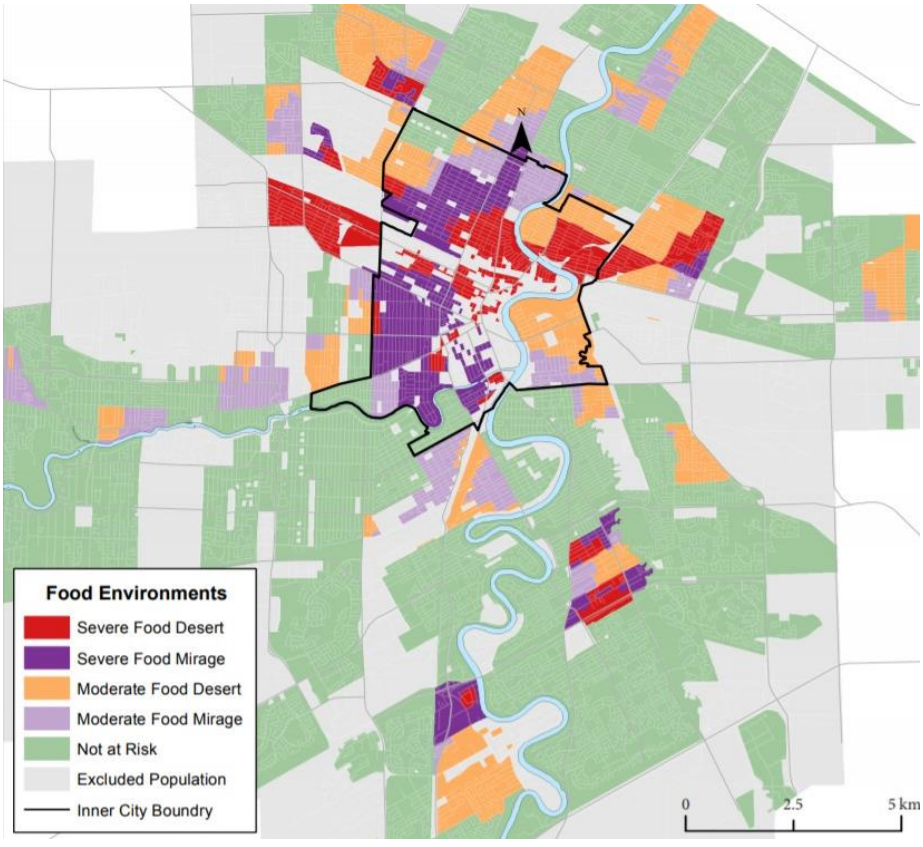


Figure 6: Mapping of food deserts and food mirages in Winnipeg showed that the concepts can be overlapping in urban areas and that food mirages are just as crucial an indication of food insecurity as food deserts. Source: Wiebe and Distasio, 2016, p. 13.

Existing Solutions to Food Insecurity

Food insecurity relief comes from a variety of community organizations, nonprofits, businesses, and governments. The federal government is the single largest contributor of resources in the fight against food insecurity, mostly through the USDA's Supplemental Nutrition Assistance Program, which is known as SNAP. Traditional food banks are the other common method of food relief activity, with homeless shelters, food banks, charities, and other nonprofits operating out of brick-and-mortar locations where food insecure individuals voluntarily go to attain food at no cost. While these are effective relief measures that are time-tested and proven, new and more innovative solutions are coming to the forefront in an effort to increase the social justice of food distribution by bringing the process directly to disadvantaged communities and getting to the root of inequality which drives food insecurity in the first place.

Some of the most effective solutions to urban food insecurity involve grassroots organizations working hand-in-hand with government to help shift the power dynamics of distribution to focus on bringing marginalized people into the process of making and distributing food. In this vein of grassroots activity, community-supported agriculture, mobile farmers markets, and urban community gardens and youth involvement are seeing increasing usage in urban America.

SNAP and Other Public Policy Solutions

The role of government in addressing food insecurity is a massive one. Without the support of federal and state money and the dedicated work of USDA and state agriculture agency officials, the most effective food insecurity relief programs would not be here today. SNAP,

which used to be called food stamps, is the largest among these government initiatives to combat food insecurity.

Congress approved $60.4 billion to be spent by the USDA on SNAP in 2019 alone, a titanic amount of money which accounted for sixty-five percent of all USDA food and nutrition assistance spending (USDA ERS, 2021). SNAP has been well-documented as an effective use of federal spending to bring supplemental food assistance to over 35.7 million participating individuals (Rosenbaum, 2013) (USDA ERS, 2021b). SNAP provides families with an average monthly benefit of $138 for one individual and $477 for a family of four, with other benefit levels that correspond to the total number of people in the household. SNAP is spent through the use of an Electronic Benefits Transfer, or EBT, card which can be used at approved food retailers for approved food items (CBPP, 2021).

To address the exacerbated conditions of poverty due to job losses and health care costs in the COVID-19 pandemic, the USDA implemented a temporary Pandemic EBT program, or P-EBT, which allowed eligible school children to receive benefits loaded on their families' EBT cards. These benefits were expanded by 15% in early 2021 (USDA FNS, 2021).

Other measures that governments often invest in to combat food insecurity include food vouchers, like the Healthy Incentive Program (HIP) in Massachusetts which puts money back on EBT cards when they are used to purchase eligible locally sourced fruits and vegetables (DTA, 2021). State agricultural agencies have each developed their own process for individuals to apply for SNAP and the voucher programs like HIP, which are separate from USDA's SNAP.

In Chelsea, Massachusetts, the local government developed a more innovative and ambitious voucher system by piloting what is considered a universal basic income to 2,000

families. Chelsea is a community strongly afflicted by food insecurity and is one of the most densely populated cities in Massachusetts. As part of a pandemic relief program, the city of Chelsea implemented Chelsea Eats in November 2020, designed to pay food insecure households a monthly stipend of up to $400 per month loaded on Visa cards to be used without any spending restrictions. The transactions were kept on record and analyzed by the Harvard Kennedy School in May 2021. Of 47,624 transactions to that point worth about $2.1 million, the Harvard study found that about seventy-three percent of purchases took place at businesses where food is the primary product. Supermarkets like Market Basket received thirty-two percent of the total spending. Gloria Caballero, a Hispanic woman who lost her job in food service early on in the pandemic, said Chelsea Eats was particularly helpful because it covered so many other things that SNAP did not cover. However, the Chelsea City Manager says more funding from the federal government is needed if the program is to continue long term (Rosen, 2021).

Universal free breakfast and lunch in low-income school districts is another popular food security policy that is heavily invested in by the federal and state governments. Nearly 31,000 schools in the U.S., representing 15 million children, participate in the federal government's Community Eligibility Provision, or CEP, in the Healthy, Hunger-Free Kids Act of 2010. The USDA uses this provision to pay for entire schools in districts with high rates of poverty – only those schools where forty percent of the students' families are SNAP-eligible – to provide free breakfast and free lunch to students. This solution has been touted as efficient in reducing administrative work on the part of the schools in distributing free meals to certain students and in eliminating the stigma that students may feel amongst their peers when in line for a free lunch, since the entire school gets the meals for free (FRAC, 2021).

Worcester Public Schools has received federal funding each year because of the Healthy, Hunger-Free Kids Act of 2010 to provide free meals for all the district's students (WPS, 2021). However, more can be done to make WPS free meals healthier, locally sourced, and more appealing to students who may be from households with marginal food security that could benefit from the program but do not want to eat the school-provided food because they are not as appealing or not as healthy as home-prepared meals.

Numerous grants programs offered by the USDA and state agriculture agencies also help to initiate partnerships between nonprofits, businesses, and other governments to bring them into the process of mitigating food insecurity. Billions of dollars flow through the USDA and the fifty state agricultural agencies every fiscal year to help organizations fill the gaps of food insecurity where government cannot reach or does not have the necessary expertise or resources (USDAb, 2021). This philosophy of government as facilitators for other organizations and individuals to do the work by providing subsidies, operational funding, capital, permitting, licensing, contracting, or technical assistance is the driving force behind all modern U.S. government activity across many different sectors, especially when it comes to combating food insecurity.

To analyze an example of a program which acts on this philosophy, look at New York City. In New York City, an estimated 750,000 residents live in food deserts, while about 3 million people live in food mirages with low access to fresh produce. These people are concentrated in communities with larger proportions of Black residents. This widespread food insecurity is because urban supermarkets in New York have become an increasingly unprofitable venture for even the largest of companies, with sky-high rent prices and grocery stores in general already having low profit margins (Food Empowerment Project, 2021).

To respond to these problems, the city government started a program in 2008 called Green Carts, which allows mobile food vendors to receive permits with the city to deliver fresh produce to underserved neighborhoods (NYC DOHMH, 2021). While Green Carts does not involve city employee vendors, does not offer financial incentives to either or vendors or consumers, and does not mandate that vendors must accept SNAP, it has been found to dramatically increase access to and consumption of fresh produce in New York neighborhoods where access is otherwise limited (Fuchs, et. al, 2014, p. 2). The philosophy of facilitating activity to address urban food insecurity proved useful in the case of New York City's Green Carts program.

Understanding that public-private partnerships and public-nonprofit partnerships are crucial to combatting food insecurity allows for public policy in Worcester that is both grounded in reality, cooperative, and effective.

Community Organizations' Traditional Food Relief Solutions

Food banks, homeless shelters, charities, nonprofits, and other community organizations serving as brick-and-mortar food relief options for food insecure individuals is one of the most common and time-tested methods of countering food insecurity.

Feeding America, the largest chain of food banks in the U.S. which is also the parent nonprofit of the Worcester County Food Bank in Shrewsbury, describes its work as collecting food and distributing it to hunger-relief charities. Their locations act as storage and distribution depots for smaller agencies such as food pantries that are on the "front lines" in communities where affordable access to food is most needed (Feeding America, 2021b). These food banks, homeless shelters, pantries, and similar nonprofits are the backbone of the fight against food

insecurity. In recent years, more and more community organizations have committed to innovative solutions to complement the traditional methods of food relief by starting to address the root problems – inequitable distribution and systemic racial inequality – at the core of food insecurity.

Community Supported Agriculture

More creative measures besides the traditional food relief policies in the U.S. are gaining traction all around the country. Community supported agriculture, or CSA, is one innovative method that local farmers and consumers have created to address sustainable food production and distribution.

One example of a CSA is Uprising Organics, a small organic vegetable farm in Appalachian North Carolina. The CSA began as a SNAP-only program in 2007 to improve low-income households' access to food. CSA's provide consumers with an opportunity to purchase subscriptions or "shares" before harvest season which go directly to the small farm, which in turn provides each subscriber weekly with an assorted box of fresh and locally sourced produce. At Uprising Organics, it is $10 per week for an individual, $15 per week for couples or a small family, and $20 per week for a full family share. This translates to $200, $300, and $400 per season, respectively. This helps maintain some degree of affordability in getting families the fresh and healthy produce that they might not otherwise have access to if they live in a food desert, swamp, or mirage, especially when the CSA takes SNAP transactions. CSA's help strengthen the food system's resilience by helping small farms pay for their operating costs and keeping their products local and fresh, thereby reducing logistical costs and the greenhouse gas emissions associated with those logistics (ASAP, 2013, pp. 3-4).

CSA's that are food stamps-accessible, like Uprising Organics, can be useful, supplemental solutions to get small groups of consumers the produce they need to sustain healthier diets and consumption habits. For those who have access to food stamps, CSA's can be a helpful way to spend their benefits. However, for those living close to the poverty line who may not fully qualify for food stamps, the payments required for small farms to get their operations set for the coming season's harvest may be too much to stomach (ASAP, 2013, p. 4). Additionally, the small size of participating consumers in CSA's and the limited amount of products that small farms have in a season makes it difficult to scale up the solution to help more food insecure households.

Mobile Farmers Markets

Mobile farmers markets have emerged as a way to bring healthy food directly to low-income and disadvantaged communities by literally driving the food to the residents. These markets are one of the USDA's favorite methods of combatting food deserts, since they eliminate the distance between households and healthy food (Neal, 2019). Many of these farmers markets, operated by community nonprofits, are also accessible to those using food stamps.

The first successful mobile farmers market program in New England was started in 2012 by the Regional Environmental Council, or REC, which is one of Worcester's food and environmental justice nonprofits (DCM, 2020). Mobile farmers markets have spread throughout the country, with food and environmental nonprofits primarily using trucks, vans, buses, and other vehicles to haul locally sourced, organic, and healthy food directly into communities with widespread food insecurity. Consumers can purchase food directly from the nonprofit without having to worry about subscription or membership fees or about finding transportation to the nearest food bank or shelter. Consumers are also able to use food stamp payments to subsidize

their purchases, whether it be SNAP or other state-level vouchers like HIP. The food found at these mobile markets often have an explicit focus on selling fresh, locally sourced produce, which helps food insecure households supplement their food purchases with affordable and healthy food (Spencer, 2013).

National models for mobile farmers markets include examples from all across the U.S. In Washington, D.C., a retired school bus painted green brings sustainable produce to schools, parks, churches, and senior living facilities in food insecure neighborhoods of the city. In Indianapolis, a truck used by Indiana University provides locally sourced produce to a county that only gets about two percent of its recommended daily intake of fruits and vegetables. Fresh Truck brings healthy food directly to residents in low-income communities in Boston, a city which has thirty percent fewer supermarkets per capita than the national average (Spencer, 2013). Feeding America also has a mobile pantry program, where they distribute food in pre-packed boxes in "significantly underserved or hard-to-reach areas," in a farmers market setting (Feeding America, 2021d). Alongside these existing nonprofit programs, new ones are cropping up every year all over the country.

Urban Community Gardens

Disadvantaged, food insecure communities tend to benefit greatly from initiatives which empower them with the ability to locally produce and distribute their own food. Community gardens in urban spaces bring food production, which is traditionally clustered in rural areas far outside cities, directly into these communities which face problems with accessible, fresh produce. With the significant impacts of the COVID-19 pandemic and subsequent economic crisis on supply chains in all industries including food distribution, community gardens have

proved even more relevant as a measure of increased resilience in the face of food shortages at supermarkets and food pantries (Mercado, 2021).

Figure 7: Vacant industrial lots in cities are often repurposed for urban agriculture. This one in Worcester is a Regional Environmental Council urban community garden being tended to by volunteers and community members. Source: Worcester Telegram & Gazette, 2013.

Community gardens work by providing a shared green space, often with large wooden boxes filled with agricultural soil, where urban residents can work with nonprofits and community activists to grow food for their own households or neighborhood. Many urban residents live in rented households with no yard of their own to grow their own food in, so these community gardens offer the ability to do so. Vacant lots in cities like Worcester can be put to use as community gardens (Livingston, 2021).

Community gardens have a variety of benefits to the local community and the city at large. They beautify the cities by adding a sense of life and green spaces, they deliver fresh produce to residents who may not have access to them otherwise, they encourage healthy lifestyles by giving amateur gardeners a physically active routine along with the benefits of consuming fresh produce, they give residents an opportunity to meet one another and form a stronger community, and they also provide people of all ages with educational opportunities.

Gardening can improve the mental health of residents by giving them reliable access to healthy and nutritious food and by giving them an opportunity to develop a productive routine and a sense of community (Livingston, 2021).

An example of a successful community garden is Clinton Community Garden in New York City. On a relatively small 15,000 square foot lot, the garden contains 110 individual plots along with a public area with a grass lawn with beds of flowers and herbs. The garden is also home to a colony of bees which are kept by the residents, and at least sixty species of birds frequent the garden. The garden's lot was abandoned for twenty-eight years, filled with trash and debris from demolished buildings. When some residents found wild tomato plants growing amid the rubble, they decided to repurpose the land and grow more. Over many years, the residents formed a nonprofit dedicated to upkeeping the garden and preventing the land from being sold. They have a volunteer committee which oversees the maintenance and operations of the garden (Livingston, 2021).

Community gardens are made possible by proper stewardship from nonprofits that may charge membership dues to support the garden (Livingston, 2021). Sponsorships, grants, and fundraisers can also be used to help pay for crops, supplies, and maintenance. Many nonprofits based in mid-size or larger cities operate networks of dozens of community gardens with entire divisions dedicated to their upkeep. The Toronto Community Garden network manages 129 community gardens in Toronto's metro area, and Grow NYC, a program run by the municipal government of New York City, runs over a hundred gardens (Angrish, 2021). In Worcester, the Regional Environmental Council is the primary sponsor of community gardens, with sixty urban community gardens run by over five hundred volunteers. These community gardens in Worcester

produce over 15,000 pounds of food annually, and twenty of them are located at public schools to help introduce children to the process of growing food (REC, 2021).

Youth Involvement in Food Production

Involving youth from disadvantaged, food insecure communities in the process of making food is essential in readjusting the paradigms surrounding the injustice of food distribution. Food systems, according to researchers Dominic Glover and James Sumberg at the University of Sussex, are emergent systems of production and distribution which result from, "historically rooted, dynamic, cross-scale interactions among many processes and actors," (Ericksen, 2008, p. 234, as in Glover and Sumberg, 2020). Therefore, addressing inequality in the food system – as can arise with a variety of food insecure conditions such as food deserts, food mirages, and food swamps – requires systemic, gradual, and generational changes in partnership with traditional food relief measures that address immediate food insecurity, like SNAP and food pantries. Young people play an invaluable role in changing society as they grow into the problem solvers of tomorrow.

When it comes to food insecurity, youth can be empowered to take food production into their own hands by becoming educated about the process during their formative years. Many nonprofits seek to do this, including Teens for Food Justice in New York City. At TFFJ, urban teenagers are educated about agriculture and growing food and learn with hands-on experience how to build and manage hydroponic farms. Some of these high capacity, vertical, hydroponic farms are used within their schools to grow fresh produce to supplement students' meals. TFFJ not only educates using hands on experience, it also seeks to kickstart the, "next generation of food policy-makers," through teaching advocacy skills that allows youth to lead the fight to create more just food systems (Soll and Cairns, 2021).

There are also nationwide conferences for young people to come together to discuss what they are doing in their own communities to combat food insecurity. For example, the Rooted In Community National Network, or RIC for short, is a, "national grassroots network that empowers young people to take leadership in their own communities," (RIC, 2021). It serves as a place for youth and adults to gather and feel affirmed and inspired by each other's actions to end food insecurity in their own communities by changing the distributive processes of the food system (RIC, 2021). These types of summits and conferences are countless and exist all over the world, and are crucial in fostering the activism needed to bring equitable production and distribution into local food systems such as Worcester's. Successful solutions to food insecurity must work at engaging youth in food insecure areas and educating them about how to produce and distribute food within their community.

Food Hubs

Another highly effective type of organization which fights food insecurity is what is known as a food hub. Food hubs have a unique way of doing this – their main purpose is to help small farmers gain access to urban markets through local supply chain management and selling their food to a network of institutional wholesale clients. These wholesale clients include organizations such as businesses that employ a large amount of people, public school systems, restaurants, stores, hospitals, and more. The USDA recognizes the importance of food hubs, saying that, "regional food hubs are key mechanisms for creating large, consistent, reliable supplies of mostly locally or regionally produced foods," (Clawson, 2013).

Food hubs fill a different niche than farmers markets do, which are similar in that they bring small farms' food to market, by focusing on aggregation that gives the food hub a middleman role rather than a point-of-sale role (Clawson, 2013). Food hubs aggregate a variety

of locally grown food, such as fresh fruits and vegetables, meats, dairy, grains, locally prepared specialty foods such as kettlecorn, and other products (County Health Rankings, 2020).

Food hubs fill a unique need for small farmers by aggregating their products together to be able to fit the needs of large buyers. Small farmers often do not have the resources to produce large enough harvests to fill orders for grocery chains, institutions, and large businesses. However, food hubs offer an opportunity for the same type of produce from multiple farms to be collected together and sold in large enough quantities for large wholesale buyers. Food hubs have shown that they are financially sustainable ventures, with general demand among Americans increasing for more locally sourced healthy food (Barham and Matson, 2019). Studies show that food hubs are associated with more sales opportunities for small farmers, increased access to fresh produce for consumers, and increased use of fresh and local produce by large institutions and businesses. Food hubs' wholesale activity has also shown to increase the access of low-income, food insecure populations to healthy and nutritious but affordable foods (County Health Rankings, 2020).

Besides wholesale activities, food hubs often run other operations, such as shared commercial kitchens which offer business assistance and coworking spaces to food entrepreneurs, marketing services for certain crops and farms, and retail directly to consumers (County Health Rankings, 2020).

In 2018, the CDC reported that there are 212 food hubs in the US. Examples include Appalachian Harvest in rural Virginia, Good Natured Family Farm in Kansas City, and ReFresh Project in New Orleans (County Health Rankings, 2020).

Food Policy Councils

In order to move needle on food security policy, organizations dedicated to advocating and generating support for these types of solutions are crucial. Food policy councils conduct this work, bringing stakeholders from the food industry, from nonprofits, from research organizations, and others to develop public recommendations on improving the food system. Food policy councils can be grassroots organizations or can be commissioned by state or local governments to examine the local area's issues with food insecurity. Food policy councils help by coordinating between organizations, mapping and researching the extent of food insecurity, identifying localized causes of food insecurity, advocating for government support of the local food system, and even organizing community gardens and farmers' markets (Public Health Law Center, 2021).

Organizations and Initiatives Combating Worcester's Food Insecurity

In Worcester, community organizations have pursued or even pioneered many of the solutions to food insecurity employed elsewhere. The municipal government follows the philosophy of facilitating food relief by supporting other frontline organizations like New York City has done, as opposed to directly creating new programs like Chelsea's universal basic income. Food banks and pantries across the city offer traditional forms of food relief. Nonprofits like the Regional Environmental Council provide programming which connects food insecure residents with relief and helps empower disadvantaged communities to become self-sustainable food producers. The Worcester Regional Food Hub serves as a clearinghouse for locally sourced, healthy food and partners with other organizations like REC to get food to disadvantaged

communities. The Boys and Girls Club of Worcester helps young people and their families connect with food relief and empowers youth by teaching them hydroponic food production through a new program, 2Gether We Eat. Meanwhile, grassroots organizations such as Worcester Community Fridge and Worcester Free Fridge use activism and community building to help fight food insecurity. At universities and colleges such as Clark University, institutions and students are leading the fight against food insecurity for the city's 35,000 college students. Worcester Food Policy Council provides regular reports on food insecurity trends in Worcester to help inform other community organizations' actions and to advocate for policy solutions in government.

These measures prove that cooperation and collaboration among community organizations and government help the city more effectively combat conditions that create food insecurity. In particular, the balanced nature of supporting both traditional food relief programming such as food pantries with grassroots organizing and activism has helped alleviate the immediate detriments of food insecurity for many disadvantaged communities while empowering them to address the root causes of food insecurity.

Local Government Initiatives

Different levels of government have different ways that they contribute policies that combat food insecurity. The federal government provides spending for SNAP and free meals in food insecure school districts as well as grant opportunities, while the state agricultural agency, the Massachusetts Department of Agricultural Resources, provides food voucher programs like HIP and provides grant funding opportunities for nonprofits and farms. For Worcester's local government, resources are not focused on providing support in the areas where the federal and state government already exist. Instead, Worcester's city government focuses on con necting

organizations and facilitating local support for food security nonprofits. It also cooperates closely with the city's federal and state legislative delegations to coordinate efforts and promote Worcester's interests when it comes to food security in the state legislature and in Congress.

Food security is directly tied to environmental sustainability and climate resiliency, and this is where Worcester's city government chooses to divert much of its political capital and resources while the higher forms of government focus on other areas. In early 2021, the city council voted to adopt the Green Worcester Sustainability and Resilience Strategic Plan, called by its short form name, the Green Worcester Plan. The Green Worcester Plan is a set of commitments related to climate which seek to make Worcester one of the most sustainable and climate-resilient mid-size communities in the country by 2050. The Green Worcester Working Group, comprised of city staff, environmental and food security nonprofits, residents, and a consultant, worked to create the recommendations which were adopted by the city council. The Green Worcester Plan was built in collaboration with the state government, being formulated after Governor Charlie Baker's signing of legislation that set a goal to achieve net-zero carbon emissions for Massachusetts by 2050 (Matthews, 2021). While not explicitly addressing food insecurity, the nature of the climate crisis and the wide range of agricultural areas it is affecting is important to food production.

In furthering its facilitation of nonprofits working on food insecurity, the city lists REC and the Worcester Regional Food Hub on its website as part of the initiatives the city is undertaking. It also notes that in 2019, the city council amended zoning rules to allow farming in some residential areas by right and by special permit. This is where many of the REC's community gardens are located (City of Worcester, 2021). Again, this shows government's role

in Worcester as a collaborative facilitator clearing the way for other organizations conducting important food relief and food justice activities.

Food Banks and Pantries in Worcester

There are over twenty-one public food pantries in Worcester, including at Salvation Army, AIDS Project Worcester, Friendly House, Quinsigamond Village Community Center, and more. Many are housed at nonprofits, charities, churches, and community-based organizations. Anyone in the community can go to those locations, either by appointment or during open hours, to get free food that is donated to the pantries. The Worcester County Food Bank in Shrewsbury and other food banks and organizations donate the food used at these pantries, which are mostly located in the impoverished parts of the city's urban core, such as downtown, Main South, and the Plumley Village and Great Brook Valley housing projects (WCFB, 2021).

The Boys and Girls Club of Worcester

Another pantry is located at the Boys and Girls Club. This pantry, established in 2017, serves families who are members of BGC. Families with children at BGC are mostly from impoverished communities of color in Worcester, with the main clubhouse being located in the generally diverse but low-income Main South neighborhood. Eighty percent of the youth served by BGC are living in households at our below the poverty line, sixty-four percent are from single-parent households, and ninety-two percent are not receiving childcare services elsewhere outside of school hours. BGC donates food from its pantry to member families in need and in this way has helped over two hundred families. Fallon Health, an insurance agency and company that is significantly active within the Worcester community, sponsors the food pantry and helps stock it with non-perishable food items, hygiene products, and household supplies (BGC, 2021).

The BGC has not only achieved a partnership with Fallon on stocking its pantry, but also with the Worcester Regional Food Hub. The Food Hub, which collects fresh food from local farms in a process known as aggregation, donated over a hundred boxes of food to the BGC pantry in 2020 thanks to a sponsor of the Food Hub. BGC and the Food Hub, working alongside the Worcester Regional Chamber of Commerce, have successfully sought out state grant opportunities to continue collaborations that assist food insecure families.

To increase its focus on addressing food insecurity in the surrounding neighborhood, BGC also partnered with nonprofit 2Gether We Eat in 2021. Much like Teens for Food Justice in New York, 2Gether We Eat teaches youth how to set up hydroponic farms and grow produce on their own. Hydroponic farms allow for vertical stacking of grown produce without the use of soil, making it a viable alternative for urban buildings to be able to grow large amounts of produce in relatively small spaces, such as in a school cafeteria. Charles Luster, founder of 2Gether We Eat, teaches twelve- to fourteen-year-olds at BGC how to hydroponically grow healthy food such as lettuce, giving them the knowledge on how to start hydroponic gardens in their own communities (Mudambi, 2021).

In addition to its pantry, the Boys and Girls Club also runs Kids Café, a program that runs twice a week during the school year. Volunteers prepare nutritious meals for three hundred family members during these events, where every BGC member family is invited. BGC provides other services too. At Great Brook Valley and Plumley Village, two of the lowest income and most diverse areas in the city, BGC operates satellite offices which provide social services to families. BGC also seeks to empower the 8,000 youths it serves in a year by providing them with access to well-kept and safe outdoor sports fields, courses on civic duty and leadership, and mentoring services to foster academic success (BGC, 2021b).

BGC has been successful in its programming in helping to empower youth and provide food relief, and can claim one hundred percent of its youth graduate high school and go on to four- or two-year degrees, the military, or working full-time (BGC, 2021b). Mentorship, counseling, sports, and academic programming at BGC all helps get Worcester's most disadvantaged youth to the next level, providing them a way out of the crushing cycle of poverty, stress, and food insecurity.

Regional Environmental Council

Another nonprofit with frontline operations in Worcester's most impoverished and food insecure neighborhoods is the Regional Environmental Council. REC, headquartered in Main South, seeks to bring community members together to, "create a just food system and to build healthy, sustainable, and equitable communities in Worcester and beyond," (REC, 2021b).

REC fights for food justice with a three-pronged approach that each addresses different areas of food insecurity. The Urban Garden Resources of Worcester, also known as UGROW, supports a network of over sixty community gardens dotted throughout the city, run by about five hundred volunteer gardeners from different neighborhoods (REC, 2021). The YouthGROW internship program employs about forty high school students to help REC build and maintain urban gardens, harvest crops, and staff their farmers markets. The teenagers in YouthGROW are also educated on professional development, leadership skills, urban agriculture, and social justice awareness and activism (REC, 2021b). The third prong is REC farmers markets, both mobile and standing. REC researches what parts of the city are most food insecure and selects sites for standing community markets and mobile markets based on this criteria, allowing them to specifically target food insecure populations (REC, 2021d).

UGROW is a network of sixty-seven urban community gardens, twenty of which are located on public school properties. REC's UGROW volunteers work with residents living near the garden to maintain it and provide them with gardening and harvesting advice. The volunteers also conduct compositing services free of charge, test the soil for chemical contaminants, offer free seeds, and pay for an official sign for the garden. The UGROW gardens are located at a variety of locations which help serve Worcester's low-income and food insecure populations, in neighborhoods such as Coes Pond, Elm Park Towers, Plumley Village, and at facilities such as UMass Medical School, the Worcester Senior Center, the YWCA, Abby's House, and more. The food produced at these gardens can be collected by residents or people using the facilities they are located at (REC, 2021b). This expansive network of urban gardens is helping to reshape Worcester's agricultural supply to become much more localized, thereby reducing the greenhouse gas emissions used to transport food from far outside the city, increasing the accessibility of healthy and nutritious food for residents who may lack access because of food desert, mirage, or swamp conditions, and educating adults and youths on sustainable urban farming practices.

The YouthGROW internship program fights food insecurity by exposing Worcester's next generation of leaders, farmers, activists, and community workers to hands-on experience and education about urban farming and food justice. YouthGROW participants, aged fourteen to eighteen, work on two youth-led urban farms on Oread Street in Main South and Grant Square Park in Bell Hill. YouthGROW is a twelve-week program from June to August which gives participants about twenty-five hours a week to support and mentor other youth volunteers who are not in YouthGROW, to support REC staff, and to help staff events. The participants also get workshop-style classes which center on professional development, leadership, urban agriculture,

and social justice awareness and activism. REC prioritizes students who live in the Main South or Bell Hill neighborhoods where the two youth-led gardens are located. Seven YouthGROW alumni are selected to return to the program as Youth Leaders every summer, and others with at least two years of experience can get junior staff positions with REC. YouthGROW is sponsored by other community organizations and businesses that believe in its model of empowering youth, including Hanover Insurance Group, UMass Memorial Health, Stop & Shop, the United Way of Central Massachusetts, the Greater Worcester Community Foundation, and others (REC, 2021c).

Last but certainly not least, REC's farmers markets provide an opportunity for food relief for many food insecure individuals. REC hosts both standing community markets with food stands and mobile markets that use vans to bring food to places like church parking lots. During the height of the COVID-19 pandemic in 2020, REC served 5,545 unique customers across both the mobile and standing markets, over eighty percent of which were receiving some form of government food stamps or vouchers. About one hundred thousand pounds of produce was sold at REC farmers markets that year (REC, 2020). The markets source their food from over twenty-five local farms, mostly using food gathered by the Worcester Regional Food Hub. Some surplus produce is also gathered from UGROW's urban community garden network.

In response to the pandemic, REC launched HIP2Go, a program which gave HIP recipients the opportunity to pre-order produce every week and retrieve it through low- or no-contact curbside pickup. These locations were accessible to people who rely on public transit, with locations in food insecure hotspots such as Plumley Village, Elm Park Towers, the Worcester Youth Center, and the Worcester Senior Center (REC, 2021d).

Also in 2020, REC worked with the city's health department to get the COVID-19 safety permits necessary to continue conducting up to ten weekly mobile market stops throughout the

city's lowest income neighborhoods from June through October. All mobile markets, like the traditional farmers markets, have the ability to process SNAP, Women, Infants, and Children coupons or WIC, and Senior Coupons. As mentioned earlier, REC pioneered the first mobile farmers markets in New England in 2012 after operating traditional farmers markets in Main South for four years. Now, the mobile markets serve between 300 and 500 customers weekly during the summer in the city's most food insecure neighborhoods.

REC's strongest attribute is that they coordinate and collaborate with other community organizations fighting food insecurity. During the pandemic, these collaborations were especially important as many families faced even more dire financial situations due to the pandemic. As mentioned, REC is a strong partner of the Food Hub, a nonprofit it helped establish alongside the Chamber of Commerce, the Worcester County Food Bank, and The Health Foundation of Central Massachusetts in 2015. They source most of their farmers markets' food from the Food Hub, and in 2020, used the Food Hub's shared commercial kitchen at Greendale People's Church to pack HIP2Go grocery boxes. REC also donated 970 bags of fresh and local produce to the Boys and Girls Club, which they then distributed to families in need at their Great Brook Valley and Main South locations. REC donated an additional 6,000 pounds of produce to four local food pantries and partnered with Project Bread and Mass Health to provide free produce to food insecure patients with chronic health conditions. REC also collaborated with the state government's emergency P-EBT program to ensure wider access to their farmers market customers (REC, 2020).

REC is an organization that is at the forefront of food insecurity in Worcester, building collective action in communities through their urban gardens, youth education, and farmers markets to build a more just food system for the city's most disadvantaged populations.

Worcester Regional Food Hub

Another organization that proves successful because of its collaborations in fighting food insecurity is the Worcester Regional Food Hub. The Food Hub is a nonprofit subsidiary of the Worcester Regional Chamber of Commerce with a mission to build a more robust and just regional food system for Central Massachusetts. Like REC, it also employs a three-pronged strategy of how it achieves its objectives – a shared commercial kitchen, aggregation and wholesale, and retail. The Food Hub is planning an important new construction project at Union Station which will create a new headquarters for the nonprofit that will allow it to exponentially increase its activities that help bolster the regional food system.[1]

The shared commercial kitchen at the Food Hub, located at Greendale People's Church, has supported eighty-six food businesses since 2015 and is currently home to fifty-one members in 2021. By providing kitchen members with access to a clean 24/7 shared kitchen with professional equipment, new business owners can begin making product and selling it to establish themselves in the Worcester market. Business advice, marketing opportunities, food safety training certification, and pop-up events are all opportunities that Food Hub businesses can take advantage of when paying the affordable hourly rate to use the kitchen. The Food Hub has a diverse roster of kitchen members, including a granola company, a spice blend business, an artisan donut bakery, and an Indonesian food catering company.

There is also kitchen programming specifically made for disadvantaged groups – in 2019, the Food Hub received grant funding from the state to give free business assistance training and certification to several women-, immigrant-, and refugee-owned food startups. This helped give

[1] Note: there is little parenthetical citation regarding the Food Hub's activities because the author has accumulated this knowledge while working as the Worcester Regional Chamber of Commerce's liaison to the Food Hub.

an opportunity to empower the diverse tastes of these people's cultures, giving the owners a chance at financial sustainability while doing what they love, and bringing diverse and well-made cuisine to Worcester. One graduate of the program, Unique Café, owned by a Jamaican immigrant woman, successfully transitioned to a brick-and-mortar location near Kelley Square during the pandemic in 2020 (Sullivan, 2021, p. 10). Many of the businesses that are successfully incubated by the Food Hub such as Unique Café end up buying wholesale from the Food Hub to get their ingredients from local sources.

Wholesale is a crucial operation for the Food Hub. While Worcester County is home to one in five Massachusetts farms and the largest amount of agricultural land in the Commonwealth, Worcester still struggles with food insecurity. The Food Hub specifically addresses this divide by trying to improve the farm-to-plate food system and supporting local food producers.

The Food Hub contracts with local small farms to collect their product and brings them all to a cold storage facility that the Food Hub rents out in Worcester. This process is called aggregation. The aggregated food is then sold wholesale to institutional buyers such as colleges, hospitals, and restaurants – organizations that feed many people during the day and require large amounts of food to be made. These institutions can opt to buy Food Hub products, thereby supporting local farmers and encouraging the consumption of healthier food that is locally sourced. Since 2015, well over a hundred institutional buyers have purchased wholesale from the Food Hub, including College of the Holy Cross, UMass Memorial Health, and even Worcester Public Schools for a period of time before 2020. The wide reach that these institutions have in the number of employees, students, patients, clientele, and others in Worcester that they serve food to is instrumental in increasing consumption and demand for healthy, locally sourced food.

One of the Food Hub's top priorities is reaching a wholesale agreement with Worcester Public Schools, but many educational institutions like WPS are in contractual supplier partnerships with massive wholesale companies like Sodexo or Chartwells which can complicate their relationship with food hubs in general. Budgetary constraints are also an issue for public school districts like Worcester, which sometimes rely on government grant money to participate in programs which enable purchases of more nutritious and appealing cafeteria foods. This is lack of funding is one complication that the Food Hub faces in trying to partner with WPS. The lower-income and majority-minority school district which is comprised of forty-three percent Hispanic, seventeen percent Black, and twenty-eight percent white students serves the families of many food insecure neighborhoods in Worcester, making it a prime strategic opportunity for investment in healthy, locally sourced food (DOE, 2021).

The most important wholesale partner of the Food Hub is REC. REC places the most wholesale orders of any institutional buyer. This is primarily because REC uses Food Hub-aggregated food to stock their farmers markets programs. Their farmers markets are also supplemented by produce grown in their own UGROW community garden network. The farmers markets, especially the mobile markets, are a critical partnership with the Food Hub to get locally sourced and healthy food into neighborhoods affected by food insecurity. Over eighty percent of the 5,545 unique customers at these farmers markets use SNAP to subsidize their purchases, so the priority, food insecure populations are being reached by Food Hub food (REC, 2020). Partnerships with community organizations through wholesale is an important way the Food Hub collaborates with others to help fight food insecurity.

The Food Hub has also worked to engage college students around the city, with students designing projects to help improve Food Hub operations for academic credit. WPI students

designed a digital reservation system for Food Hub kitchen members, Worcester State students and faculty are working to establish new food entrepreneurship programming, and a local internship program run by a Clark University alum and comprised of Clark students helped the Food Hub with marketing efforts.

The Food Hub also provides SNAP-accessible grocery boxes that are sold directly to consumers through the Food Hub's website. The retail grocery box program was started in the pandemic as a curbside pickup option that allowed the Food Hub to pivot to a new revenue stream as the number of wholesale purchases from restaurants and the number of member startups using the kitchen started to dwindle from public safety restrictions like the statewide stay-at-home order. This retail program will need stronger marketing in the future to be able to reach the priority food insecure populations in Worcester, since the Food Hub was only recently approved for SNAP transactions by the USDA (Worcester Regional Food Hub, 2021).

To increase the capacity of kitchen, wholesale, and retail activities, the Chamber of Commerce and the Food Hub have worked with the city government to identify the lower level of Union Station as a feasible location to build a new permanent headquarters. The roughly 6,000 square foot space in the lower level of Union Station is currently used as a storage space for the building, which has been owned by the city's redevelopment agency since the station was rebuilt for $32 million in 1999 (Mudambi, 2021). The space will be completely renovated to fit a shared commercial kitchen with six sub-kitchens, a multipurpose events space, a cold storage unit, and a lofted office space for Food Hub staff.

The estimated cost of this project is about $2.3 million, and the Food Hub has conducted an aggressive grants funding campaign to secure the capital necessary to build out the space and commence operations by 2022. The city government, state legislators in the Worcester

delegation, and Congressman McGovern's office have all been stalwart supporters of the Food Hub's capital campaign and have worked on the nonprofit's behalf to pursue the funding necessary at the state and federal levels.

The Union Station facility is a necessity for the Food Hub, which as it becomes more established is starting to attract more startup business to the kitchen and more buyers to its wholesale partnerships than it is physically capable of handling at Greendale People's Church. Storage of equipment and goods is starting to overflow in the church community center, and social distancing regulations during the pandemic only allowed for one kitchen member at a time to use the kitchen. Union Station will provide an opportunity to not only give more storage and exponentially more capabilities for the Food Hub's activities, but will also activate the intermodal transportation hub that is Union Station. The station, which is the largest transportation hub in the region, provides access to commuter rail, public bus, livery, and a bike share.

Union Station is also within walkable distance to Shrewsbury Street, Worcester's famous restaurant district, as well as the Worcester Public Market. Both these clusters of restaurants are home to Food Hub members and wholesale partners. Importantly for food security, Union Station will allow low-income residents who rely on public transit to visit the Food Hub for pop-up events by kitchen members, to buy locally grown food, or to start their own business at the Food Hub. It will also provide access to a shipping dock and in-house cold storage facility which will give the Food Hub more flexibility and a much larger space for storing and packing aggregated food.

Through the Food Hub's collaborative partnerships, its ability to connect local farms to the city, and its incubation of new food startup businesses, the nonprofit plays a huge role in coordinating and supplying the fight against food insecurity in Worcester.

Worcester Community Fridges and Worcester Free Fridge

Grassroots organizations formed by community activists also play an important role. One grassroots organization, Worcester Community Fridges, also called Woo Fridge, is working to build an innovative model of community-based food relief. Woo Fridge hooks up fridges on the side of storefronts in food insecure neighborhoods in Worcester and stocks them with free food. This offers residents a chance, as is displayed on the front of the fridge, to, "take what you need, give what you can," (WCF, 2021). As lead organizer and schoolteacher Maria Ravelli says, the 24/7 free food fridge network is a form of "mutual aid," which allows residents who have surplus food to bring it to a fridge and leave it for someone who needs it more (Ravelli as in Semon, 2021). Ravelli describes it as a sustainable measure to reduce food waste and as something that anyone who could use free food can take advantage of, regardless of their level of food security (2021).

Woo Fridge collaborated with Fantastic Pizza on Main Street to open their first community fridge at the start of 2021, with a plan to expand to five fridges by the end of 2021. Woo Fridge also partners with local farms, restaurants, and community members to make sure volunteers from the organization can routinely stock the fridge (Ravelli as in Jandrow, 2021).

A similar group formed by Clark University students called Worcester Free Fridge is moving to place their inaugural fridge near "The Bridge" on Southbridge Street, a formerly abandoned mill building that has been put to use as an impromptu community center,

makerspace, and events space which emphasizes social justice initiatives. “At Worcester Free Fridge, our thing is that food access is not just about being able to access food, but it’s about being able to access fresh, healthy food of an individual’s choosing in a dignified manner,” said Clark student Lucy Barrett, who helped found Worcester Free Fridge along fellow student Bill Gove and an employee from Hanover Insurance, Khai Lai (Barrett as in Semon, 2021).

The burgeoning free fridge network in Worcester has a way to go, and requires dedicated leadership from nonprofits, restaurants, and community members, and others to maintain this helpful service without turnover from graduating college student activists. However, so far it has successfully provided residents with an innovative and empowering way to make their own choices and keep their dignity when receiving food relief.

Initiatives by Worcester Colleges and Universities

Colleges and universities in Worcester, beginning to recognize that rising higher education costs are becoming increasingly stifling and resulting in food insecurity among many of their students, have started to take the initiative to begin free food relief programs. These changes have been heralded by student activists, faculty, and administrators at all of Worcester’s eight colleges and universitites.

At Clark University, student activists have led the charge to fight food insecurity on the campus of one of the city’s most expensive private universities. In 2020, the Clark University Student Council founded the Clark Food Pantry in the University Center. Led by executive board members Emma Dinnerstein, Eunice Dollette, Ivette Mendoza, and Domenica Cevallos – the first entirely non-male-identifying executive board in the school’s history – student council worked with the administration to give food insecure students an opportunity to seek food relief

confidentially on campus. Students swipe their university-issued card with the information desk, which then grants them access to the pantry which is stocked with donated food. The pantry was especially helpful for students during the onset of the COVID-19 pandemic in 2020, when Clark's campus closed down and dining services were temporarily halted (Lynch, 2020). Other student activists associated with student council, with Clark's Jewish student association Hillel, with the school newspaper, and with other campus organizations have helped to develop solutions specifically for food insecure students and to push the administration to be more proactive on the issue (Sager, 2019) (Beilman et. al, 2020).

Clark also announced in May 2021 a program called Swipe Out Hunger, a partnership with Sodexo and a national organization founded by UCLA students in 2010 that allows students with meal plans to apply for a set of free meal swipes that can be redeemed in the university's dining halls. The extra set of swipes allows students struggling to obtain food to get it at no cost while not facing potential judgement by their peers (Swipe Out Hunger, 2021).

Worcester Polytechnic Institute has also recognized the campus's struggles with food insecurity. Working with university administrators, students have been researching the best way to improve students' access to free food. While WPI has a student organization called Food Recovery Network that collects surplus dining hall food and donates it to homeless shelters off campus, and while research collaborations between administrators and students have identified food insecurity as an issue that predominantly affects ethnic minority students at WPI, no publicly available information exists about current direct food relief programs for WPI students (Quinn-Szcesuil, 2019) (Food Recovery Network, 2021). A donation campaign by alumni was successful through 2020 into 2021, collecting over $81,000 to fund grants of up to $1,000 to the campus's most in-need students during the pandemic. Food costs could be covered under the

grants (WPI, 2021). While WPI has succeeded in helping the community around it deal with food insecurity through donating to pantries and writing community food system assessments, programs still need to manifest themselves on campus to respond to the levels of food insecurity they found in their students.

At College of the Holy Cross, the college partners with the Food Hub and Grubhub to help students get the most out of their meal plans. Holy Cross students can use the food delivery app Grubhub to get food delivered to their campus dormitory from the dining halls, which allows easier access for students who may have too little time between work and school to walk to the dining halls. Holy Cross Dining also works with the Food Hub and REC to fulfill its commitment of sourcing at least twenty percent of its food from local producers and growers (College of the Holy Cross, 2021).

Holy Cross does not have programs to specifically address food insecurity among students, but its students contribute significant efforts towards combating the issue in the community. An analysis by the New York Times found that the median family income of students on campus is $170,700, with only four percent of Holy Cross students coming from low-income families (NYT Upshot, 2017). While this does not mean food insecurity does not exist on Holy Cross's campus because its students tend to be in a higher income bracket, it does mean that the food insecurity of some lower-income students may not be recognized as a significant issue. It certainly does not mean that students are less likely to care about food insecurity in general. Holy Cross students have founded several groups to help address the issue in the Worcester community, including a club called Student Programs for Urban Development, which connects over five hundred student volunteers annually with community organizations and schools. Food Recovery Network, a national organization dedicated to redistributing surplus

food on college campuses to shelters which also has a chapter at WPI, is also operated on Holy Cross's campus by student volunteers (Holy Cross, 2021b) (Greenslit, 2015).

The work of Holy Cross in committing itself to sustainable practices and locally sourced food in its dining services is commendable, and CARES Act funding from the federal government which provides relief to students has been helpful in one-time subsidies for the school's financially challenged students, but more work can be done to improve students' access to consistent, direct food relief at Holy Cross (College of the Holy Cross, 2021b).

While Assumption University has similarly high rates of higher-income and white students to Holy Cross, resulting in less food insecurity present among students, both the university and its students do a great job of addressing food insecurity in Worcester (NYT Upshot, 2017b) (CollegeFactual.com, 2021) (CollegeFactual.com, 2021b). During the COVID-19 pandemic, Assumption was an important partner of the Worcester Railers hockey team initiative to help donate fresh meals to essential workers (Worcester Railers, 2020). Assumption students are active in engaging with community organizations such as Walk for the Homeless and Worcester Community Fridge to help raise funds for poverty and food insecurity relief. Assumption students in 2021 collaborated with Worcester Community Fridge to crowdsource over $2,000 to help keep the fridge stocked (Assumption University, 2021).

Quinsigamond Community College deals with food insecurity among its students at a higher rate than other Worcester colleges and universities and dedicates significant resources to support systems for its part-time and full-time students. After a study found that half of QCC students had low or very low food security, the college established its food pantry in 2018 with the help of a $10,000 crowdsourcing campaign. At the outset, the pantry was feeding 150 students consistently during the weekdays, with student volunteers maintaining it. QCC students

who make use of the pantry require a valid student ID card but have their information kept confidential. QCC continually accepts donations to its pantry from the community (QCC, 2021).

Worcester State University, which like QCC has a higher proportion of lower-income students partially because some QCC graduates go to WSU for their four-year degree, also operates a food pantry. In a 2019 study by university faculty, it was found that thirty-four percent of WSU students are food insecure, fifteen percent experience housing security, and three percent are homeless. Consistent with food insecurity data elsewhere in Worcester and America, it was found that Black, Hispanic, Latinx, and Asian students were food insecure at a significantly higher rate than white students. The report called on WSU, Chartwells, the student government, and even the state to implement more strategies to provide consistent food relief to students (Saltsman et. al, 2019, pp. 2-19).

Student activists at WSU are also leading the fight against food insecurity on campus. A group of students traveled to Washington, D.C. to meet with the Massachusetts Congressional Delegation to address how SNAP requires applicants to work twenty hours a week when many students cannot afford to do that but sometimes need the benefits. Students also come together from extracurriculars such as the student council, the Urban Studies Club, and the Hunger Outreach Team to discuss food insecurity. These students established Thea's food pantry in February of 2019 in partnership with the Worcester County Food Bank (Souza, 2021).

WSU now conducts widespread outreach to students who are eligible to apply for SNAP benefits to get them enrolled, operates a food pantry called Thea's which opened in 2019, and allows students to donate meal swipes for food insecure students to utilize (WSU, 2021). WSU is also exploring a partnership with the Food Hub as it continues to find ways to address food insecurity in Worcester.

At UMass Medical School, a food pantry and resource center for students was established in 2018 with the leadership of the student government and faculty. A 2015 nutritional needs study among students found that there were significant rates of "financial stress and food insecurity" among students at the medical school (Gray, 2018). UMMS students also collaborate with REC to run a community garden, and many students conduct academic public health studies and volunteer their time to community food drives and pantry restocking (UMMS, 2021). There is also a collaborative program run by the Greater Boston Food Bank which hosts UMMS students for a two-week elective course which teaches them how to address food insecurity in their future patients (Well, 2020). UMMS, as an important and statewide public institution housed in Worcester, has proved it is on the frontlines of addressing food insecurity among its students and in the community.

At Massachusetts College of Pharmacy and Health Sciences, another Worcester medical school, there is a resources page for students with food insecurity. The information about available food relief services at MCPHS is not publicly available. Like other Worcester colleges and universities, MCPHS offers a number of volunteer opportunities for its students, including food drives and community gardening. MCPHS also generates academic research on public health and food policy issues to help educate its medical students on how they as future professionals can address food insecurity (Potorti, 2021).

With Worcester's growing economy dependent on the eight colleges and universities that employ a significant portion of the local workforce, educate over 35,000 students, and bring national attention to the city, it is crucial that food insecurity be addressed in these institutions of higher education. As the costs of higher education continue to inflate, more and more Worcester college students will face hard choices when it comes to food and finances. Worcester colleges

and universities are just recently starting to recognize the epidemic of student food insecurity faced by local schools and schools around the country, and with time, sustainable and consistent solutions for every college and university in the city will emerge as long as student activists, faculty, and administrations continue to lead the fight.

United Way of Central Massachusetts

United Way of Central Massachusetts is a nonprofit dedicated to fundraising for and coordinating Worcester's community nonprofits. In 2021, they funded $2.2 million worth of programming in Worcester which is holistically focused on education, health, food, housing, crisis intervention, and other basic services for disadvantaged populations. In terms of food relief, United Way helped to fund the Boys and Girls Club, Catholic Charities of Worcester, Elder Services of Worcester Area, the Friendly House homeless shelter, Open Sky community health services and food pantry, Pernet Family Health Service emergency assistance, the Quinsigamond Community College food pantry and student support services, the Regional Environmental Council, the Southeast Asian Coalition of Central Massachusetts, and the YMCA of Central Massachusetts's home meal delivery program (United Way, 2021). United Way is looked to as a leader in Worcester's nonprofit community, and their coordinating efforts are essential in maintaining the collaborative nature in how Worcester combats food insecurity.

Worcester Food Policy Council

The Worcester Food Policy Council is the region's dedicated advocate for public policy solutions addressing food insecurity. The Council focuses on educating and advocating for solutions to food insecurity that promote justice and equality through promoting urban agriculture, SNAP access, a $15 minimum wage, and healthy food voucher programs like HIP.

The Council also partners with REC and the city's Division of Public Health to increase healthy food access at mobile farmers markets, farm stands, CSA's, and corner stores. They also advocate for the expansion of the Worcester Regional Food Hub and have partnered with minority-owned restaurants in Main South to help them develop a pilot program where healthy grab-and-go meal options are made available for customers (WFPC, 2021).

The Council conducts the bulk of its work through research and studies which examine food insecurity at a high level and give community organizations the frameworks necessary to understand where to allocate their resources. They regularly report on Worcester's public health needs through Community Health Assessments, with the most recent having been conducted in 2018. The Council also sponsored the WPI food systems study from 2013 (WFPC, 2021).

Findings and Recommendations

Through defining and examining food insecurity, analyzing Worcester's trends in food insecurity in history, conducting a critical analysis of academic assumptions regarding food security concepts, laying out general solutions to food security and solutions underway in Worcester, this paper has identified several key findings about systemic issues, each with their own recommendations.

Food Insecurity is a Complex Issue with Roots in Systemic Inequalities

This research finds that food insecurity is a complex and cross-sectional issue with roots in systemic inequalities in socioeconomic conditions. As a result, food insecurity broadly affects ethnic minority and low-income populations at disproportionate rates, raising issues of social justice due to unequal food production and distribution processes. By taking a broad and cross-

sectional approach to the recommendations, food insecurity can be better addressed in the Worcester community.

Maintain A Collaborative and Balanced Approach

Importantly, it was also found that traditional food relief measures such as pantries and charities are abundant in Worcester, but in order to actually combat the cycle of food insecurity, more innovative and empowering programs which realign the structures of food distribution and enhance social justice must be prioritized as well. A key strength of the Worcester community's fight against food insecurity is its collaborative spirit. Coordinated leadership and partnerships among the various community organizations in the city, with each one playing a different role, has helped greatly. Community organizations should continue to foster this collaborative climate and partner and coordinate with other organizations to bring a balanced approach towards fighting food insecurity.

Continually Challenge Widely Accepted Assumptions

It has also been found that food deserts and small area geographical statistics like Census tracts, as commonly accepted conceptual frameworks through which food insecurity is widely viewed by a variety of activist organizations, governments, businesses, nonprofits, and others, do not tell the whole story of food insecurity. Small area statistics must be reviewed regularly by government at all levels and policy advocates to verify their accuracy in telling the story of food insecurity, and food deserts must be viewed in the context of other food insecure conditions that emphasize socioeconomic conditions over simple geographic proximity to food – these other conditions being food mirages and food swamps, which have been well-documented in an increasingly substantial body of research. In Worcester, it is just as important to study food

mirages and food swamps to publicly identify where these problem areas are to help guide equitable solutions.

Invest in SNAP-accessible Retail in Low-income Communities

Retail access of locally sourced food can be improved upon for residents of low-income, food insecure communities. REC mobile farmers markets have been successful in reaching a significant portion of this priority population, but more can be done by other organizations to ensure widespread and consistent access.

Since Worcester County is heavily populated by farms, community supported agriculture is fairly attainable to many Worcester residents (Local Harvest, 2021). For low-income and food insecure residents, though, access needs to be improved. To increase consumption among low-income communities, marketing efforts need to take place to inform food insecure residents that they have the option to purchase shares from these farms and pay using SNAP. The number of CSA drop-off points where participants can get their food should also be improved to expand access to lower income neighborhoods where people may rely on public transit to get around (Chen et. al, 2013). Worcester residents should also be informed properly about the opportunity to purchase aggregated food from the Food Hub's website, which can process SNAP transactions (Worcester Regional Food Hub, 2021). SNAP accessibility must be a part of any new retail programs in these low-income communities as an important tool in reducing the price barriers to healthy food.

Expand and Support Empowerment Programs

The urban community garden network in the city also needs consistent support from the local government. Given the importance of REC's UGROW network in empowering residents of

the city's food insecure communities to produce their own food, the city must continue prioritizing the facilitation of leases and land ownership of lots that are home to community gardens.

Other empowering programs should be supported by the city and organizations in the nonprofit and business communities. REC's YouthGROW and UGROW programs, 2Gether We Eat at the Boys and Girls Club, and other programs which educate youth and adults about how to produce their own food for their households and their food insecure communities is essential in attempting to reverse the systemic inequalities in food production and distribution which affects many Worcester residents. These empowerment programs should be recognized as highly effective solutions in changing trends in food insecurity and should continue to be supported alongside traditional food relief services to provide Worcester with a balanced approach that seeks to address both immediate relief and deep-seeded inequalities.

Expand and Invest in the Worcester Regional Food Hub

The Worcester Regional Food Hub, which in the past few years has already proven to be an important coordinating force in the community's fight with food insecurity, needs to become headquartered at Union Station. Relocating an important community organization which helps incubate new food businesses and supplies the city's nonprofit and business community with locally produced food to a permanent location which will enable financial sustainability is essential to the long-term growth of the nonprofit. Additionally, demand is outstripping the supply that the current Greendale People's Church space has for kitchen, wholesale, and retail operations. If the Food Hub is to start consistently supplying locally produced healthy foods to large institutions such as Worcester Public Schools and nonprofits, colleges, hospitals,

businesses, restaurants, and others in the city, there needs to be an expanded capacity for wholesale.

An additional benefit is the activation of Union Station. The intermodal transportation hub is not a destination for anyone except those accessing the hub's various transit options, yet it can become activated in terms of economic development by bringing the Food Hub's operations to the building. It is an important economic development and food security priority for the entire city that the Food Hub becomes a sustainable enterprise with a permanent home in the center of the city. The Chamber of Commerce is working with government at all levels to make sure this project becomes a reality in the near future.

Worcester Colleges Must Address Food Insecurity Among Students

Until sustainable solutions for the extreme cost of higher education are found, colleges and universities must continue to regularly and consistently identify rates of food insecurity among their student populations through studies and participative surveys, and each college should have a food pantry or swipe system which allows students to get discrete food relief on campus. Even for campuses which tend to have high levels of white, higher-income students who would not be expected to be food insecure, it has been established that one does not have to live below the poverty line to struggle with acquiring healthy and affordable food. For all campuses it is important that they implement food relief programs for their students, since even one student who is food insecure is one too many.

Worcester colleges and universities should also continue to encourage their students to do academic studies, educate themselves, get involved, and work with or work for community organizations around the city. Student activism in a college town like Worcester is hugely

important in devising innovative programs like Worcester Free Fridge and in helping community organizations and nonprofits to fight food insecurity.

Conclusion

In his Pulitzer Prize-winning book *Guns, Germs, and Steel*, anthropologist Jared Diamond describes food as the foundation upon which human civilization itself is built. Diamond employs a historical, anthropological, and biological study of early civilizations to understand which regions of Earth were more likely to sustain increasingly advanced cities and nations to understand why some nations today are more advanced than others. He concluded that it was no accident that the first major population centers sprung up around fertile riverbeds in the Middle East, Egypt, India, and China – the move from nomadic hunting and gathering to mass food production and storage of surplus food in these areas allowed human societies to advance by fueling entirely new, society-building professions. Specialists like craftspeople, lawmakers, scribes, soldiers, and other professions that built powerful civilizations were fed by food production, giving the entire society an opportunity to advance (Diamond, 1997).

In this way, Diamond argues that the equitable distribution of nutritious food is a fundamental building block of human society. When communities are deprived of such access, it places them at a decided disadvantage in life.

Any public administrator, policymaker, or leader in general should dedicate themselves to the idea of a society where every person enjoys the same opportunities as anyone else, since no human being is inherently worth more or less than the next. Food insecurity proves to be a

stubborn obstacle in the way of achieving this equality, especially in postindustrial cities all over America like Worcester.

As mentioned earlier, Worcester is at a turning point. The city is in the midst of a complete economic development turnaround because of the collaborative efforts of the community and government to bring new construction projects to the city, such as Polar Park. This is a great way to improve the quality of life for many residents and employees in Worcester. However, these developments have to be balanced out with things like new affordable housing and investments in sustainable infrastructure and job opportunities which will encourage an equitable economic development strategy that will not price lower-income residents out of their neighborhoods. Alleviating food insecurity is a massive part of ensuring no Worcester resident is left behind. Worcester, in order to continue living up to its promise as a land of opportunity, has to be ever vigilant in this matter.

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